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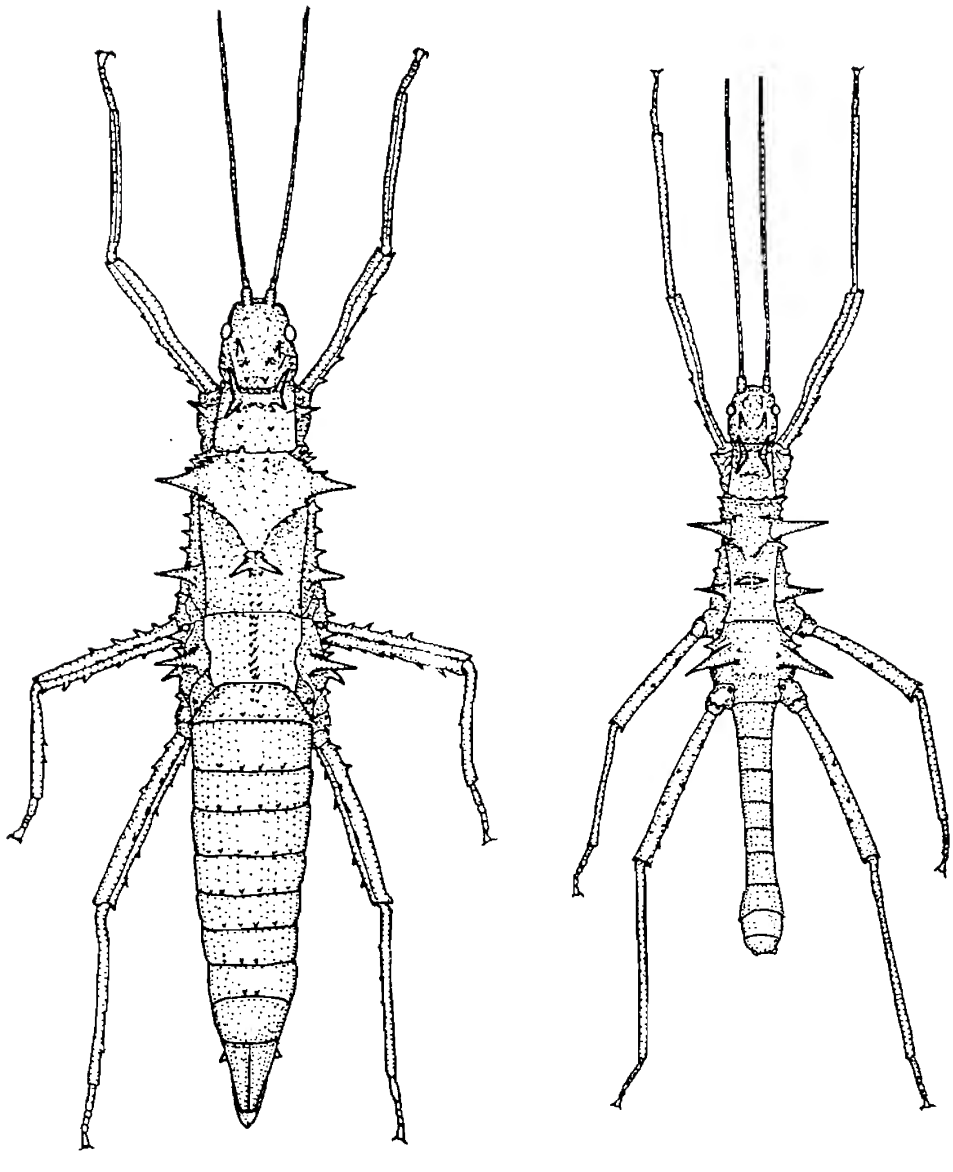
June & December 1992.

Editor: P.E. Bragg.



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Phasmid Studies

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Contents

Cover illustration: *Hoploclonia gecko* (Westwood), by P.E. Bragg.

Editorial

Welcome to the first issue of *Phasmid Studies*. Although I had not intended to write an editorial, a last minute alteration created a spare page and I felt an introduction was desirable in the first issue. *Phasmid Studies* is quite a change of style for the Phasmid Study Group and you may be interested in a brief history of how this came about, and the ideas behind some of the changes. This first issue is slightly smaller than originally anticipated so I would like to encourage more people to write articles for *Phasmid Studies*. There are lots of species in culture and for many of these no one has ever explained how to keep them so there is plenty of scope for **you** to write an article.

History of *Phasmid Studies*

For more than ten years the Phasmid Study Group has been producing a quarterly *Newsletter*. This had grown from a first issue with four pages in 1980 to over twenty pages by 1990, with one issue reaching almost thirty pages. Michael Lazenby and Frances Holloway had been editing this since 1984 and decided that the job was interfering with their other interests and they could not continue beyond the end of 1991. In view of the quantity of work involved in producing *Newsletters* of such a size, it is perhaps not surprising that there were no volunteers to take over the original format.

At the AGM in January 1992, the PSG committee decided to take up offers to split the *Newsletter* into two parts, each produced by a different editor. The *Newsletter* continues, edited by Paul Taylor, and will deal mainly with administrative issues, exhibitions, meetings, and the very short articles about phasmids. *Phasmid Studies* will publish longer articles, including reports on rearing species in culture.

The style

There are a number of changes in the style of articles in *Phasmid Studies* compared to the *Newsletters*. Author's names and addresses are included so that non-members of the PSG can be easily contacted if they have articles printed in *Phasmid Studies*. A list of keywords helps anyone with a computerised or card index system to record the important topics in the article. With species reports, if the person writing the article is unable to do so, I will usually add a list of previously published items which refer to the species concerned. References are listed to help you to find further information. The Phasmid Abstracts section will give you an idea about other publications and help you decide if you are interested in reading them.

Writing articles

Articles are very welcome from **anyone**, if you would like to contribute but need some advice or help please get in touch with me. As a general rule you will be sent a copy of your article to check before it is published, this way you can spot any mistakes before printing. If you use an IBM compatible computer please send your contribution on a disk, this will be returned; please see the instructions on the inside back cover for details.

Drawings

Whenever possible I would like to include drawings with articles. In order to reproduce the drawings they must be done in black ink. The best way to do this is to do the drawing in pencil and then go over it in ink, using a fine fibre tipped pen. Corrections can be made with correcting fluid eg. *Tipp-ex*. If you don't feel able to do a suitable drawing a note can be put in the *Newsletter* and perhaps someone else can provide the illustrations.

P.E. Bragg.

Observations on egg laying by *Epidares nolimetangere* (de Haan) and *Dares ulula* (Westwood)

Ian Abercrombie, 59 Romney Road, Willesborough, Ashford, Kent, TN24 ORR, U.K.

Key words
Phasmida, *Epidares nolimetangere*, *Dares validispinus*, *Dares ulula*, Egg laying, Hairs.

In January 1990 Phil Bragg sent me approximately 40 eggs of *E. nolimetangere*, PSG 99. These eggs are oval, 4mm x 2.5mm diameter, dark brown and are covered with long fine brown hairs that appear to have the property of velcro in that they tend to stick together (I often find 7 or 8 stuck together in this way, I also find many apparently laid singly at random).

Phil kindly wrote a covering note on the conditions they enjoy; if kept warm and moist they appear to thrive. This proved to be the case and in about a year I had 10 adult females and 5 males; the surplus I had given away to other PSG members. I keep the insects in a large plastic propagator (500mm x 350mm x 25mm) with approximately 60mm of medium sized vermiculite on the floor. I feed them on Bramble, Rose, Oak and various other shrubs (to give them variety). This diet seems to suit them and I have very few losses.

On the 5th May 1991 at 9am, I looked into the propagator and noticed that the foliage appeared fresh but dry so I sprayed it with warm tap water. The effects on the females was very interesting, almost all started to dig into the vermiculite. This act in itself was worth observing. The rear and middle legs were splayed and the forelegs pulled the granules from in front and under the head, making a mound under her body. In about 10 minutes each female had made a depression about 15mm deep and the vermiculite was piled up under her body. I realized that I was about to witness egg laying and expected the females to move forward over the holes to deposit an egg or two, then move off leaving the eggs to hatch.

What happened next took me completely by surprise. The female I was watching bent forward at an angle of about 30° with her head down the hole and her ovipositor over her back. Suddenly there was a flick and an egg appeared to hit the female on the back, roll over her head and into the hole. She then immediately started to pull more vermiculite into the hole apparently to cover up the egg. She spent 15-20 minutes filling the hole with the same action as before, then walked away to get a drink from the wet foliage, leaving the pile of vermiculite that was under her body in a heap indicating the egg directly in front of it.

I was trying to watch about six females at the same time and I kept missing the vital second (The act of egg laying is extremely fast, like *Extatosoma tiaratum*).

These observations raised some immediate questions:

1. Has anyone else seen behaviour like this?
2. Do other *Dares* species use this method of egg laying?
3. Are the spines present on the females back used as a guide for the egg?
4. Are these the only phasmid to bury their eggs with their forelegs?

I decided to try to observe other *Dares* spp. but as they are extremely inactive in light, pretending to be dead most of the time, I was aware that it might be some time before I got any results.

On May 11th I made further observations of *E. nolimetangere* and clarified some points.

1. The insect may use any of its six legs to collect material beneath it, but mostly the

forelegs are used.

2. Before the egg is laid there is much flexing of the ovipositor and a few practice flicks, in slow motion so there is no prospect of releasing the egg too soon.
3. In most cases the egg passes over the abdomen, thorax and head of the female and lands upon her antennae where it sticks by means of its fine hairs. So the spines do not normally act as guides for the eggs.
4. The female immediately removes it with her forelegs and starts to bury the egg. This is a very haphazard-process. The insect appears to work by feel and not by sight; perhaps the size of the vermiculite confuses them, it is roughly the same size as the egg.

I have examined the eggs of *E. nolimetangere* under a microscope and found that the hairs on them are strongly hooked at the ends and quite stiff, looking like crochet hooks. It is important that the egg is no more than a few days old when studied through a microscope as the hairs tend to become brittle and the hooks snap off. When 60 or 70% of the hooks have been damaged in this way the egg loses its ability to grip. This doesn't matter once the egg has been deposited as the hooks have done their job and to all intents and purposes are redundant. I have looked at the antennae of *E. nolimetangere* under the microscope and found that they are densely covered with short, stout, curved hairs, exactly suited to catch the egg.

I have looked at the antennae and eggs of the three related species which are in culture, *Dares validispinus*, *Dares ulula*, and *Dares* sp. (PSG 69), and compared them to *E. nolimetangere* (see table 1). Having looked at the ovipositors of these species I did not believe they have the flexibility to lay eggs in the same way as *E. nolimetangere*. Despite many hours of observation I did not observe the act of egg laying in any of these three species until April 1992.

SPECIES	ANTENNAE HAIRS	EGG HAIRS
Dares sp. **PSG 69.**	Less hairy. Hairs are straight.	Less hairy. Hairs straight.
Dares ulula (Westwood) **PSG** 117.	Hairs long. Hairs straight.	Almost hairless.
Dares validispinus Stål **PSG 38.**	Less dense. Curved.	Almost hairless.

Table 1. Comparison of antennal and egg hairs.

In April 1992 a friend had come to visit and he was holding a female *D. ulula* while I was explaining how slow they are to lay eggs, only producing one every two weeks. I showed him some eggs lying on the vermiculite in the cage and he said the female in his hand had an egg in her ovipositor. I gently put her back into her container. Her front and middle legs were on the vermiculite and her back legs on a bramble stem, her body was at an angle of about 20°. She stayed in this position for about two minutes and when she appeared to be completely relaxed, she started to flex her abdomen in exactly the same way as *E. nolimetangere*. After five or six slow practice flicks, she flicked the egg at great speed over her head. The egg landed about 7cm in front of her and bounced to the edge of the container, a distance of about 15cm. The female made no attempt to look for the egg and appeared to ignore it. She remained in the same position for three or four minutes and then walked under a leaf. I then put the lid on the container and returned

the box to its normal place.

My conclusion is that both *E. nolimetangere* and *D. ulula* lay their eggs by catapulting them over their bodies. *E. nolimetangere* catch the eggs on their antennae by means of the hairs on the egg, the insect then removes the egg with her forelegs and buries them. It has taken me two years to see these two species egg laying, I have not yet seen *D. validispinus* or PSG 69 lay their eggs but I now believe that they flick their eggs over their heads in the same way.

PSG 47, *Bacteria* sp.

Matthew Gale, Median Lodge, Pipers Yard, Acre End Street, Eynsham, Oxford, OX8 1PE, UK.
Drawings of adults by Phil Bragg.

Key words
Phasmida, *Bacteria* sp., Costa Rica, Rearing, Foodplants,

Classification

This species appears to belong to the genus *Bacteria* which was first described by Latreille in 1825. Identification to species level has not yet been made.

Culture Origin

The present culture was collected from Costa Rica by Allan Harman.

Adults

Females generally range from 170-190mm in length with a width of about 7-10mm. Colours vary from dull chocolate brown to grey, often with some very faint green markings ventrally. They have a rough texture, like bark, and the thorax is covered with many small bumps and tubercles, particularly on the mesothorax. Females exhibit lobes on the first tarsal segment of each foot, as well as on the seventh abdominal segment (similar to those found on the female nymphs of *Acrophylla wuelfingi* and *Ctenomorphodes briareus*). Often they possess a blunt spine on the dorsal, posterior portion of abdominal segments two through six. The sub-genital operculum extends beyond the tip of the abdomen and is quite flat apart from upward curving edges and a downward curving tip. The sub-genital valves protrude above the operculum noticeably. The cerci are very small.

Males are very slender, being 2-3mm thick and measuring between 110-130mm in length. They are light brown in colour with a green mesothorax and ventral metathorax, with black and cream bands on the middle and rear femora. Unlike the female, the male appears quite glossy. The sub-genital plate is large and very bulbous, the cerci are larger than the females and are used to clasp her during mating.

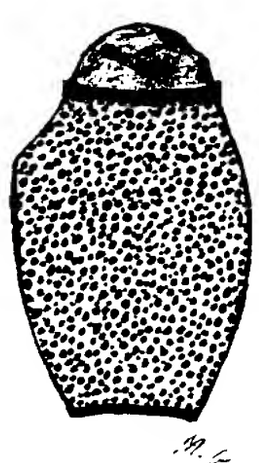


Figure 1. Egg of PSG 47, *Bacteria* sp.

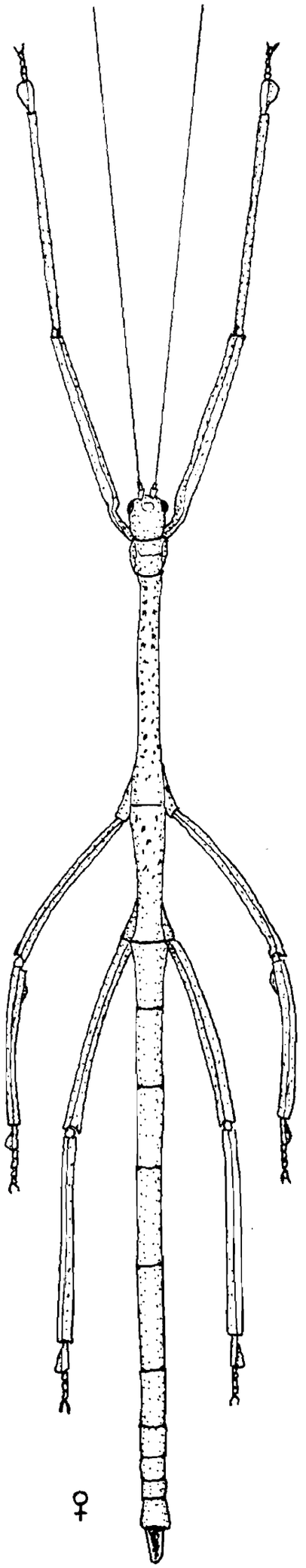
Both sexes have quite round heads and bulbous eyes. The female's limbs tend to be somewhat flattened whereas the males legs are proportionately longer, slimmer and rounded.

Both sexes live for about four months as adults. Mating is frequent and males may remain attached to females (although not always actually mating) for several days.

Eggs (fig 1.)
These are light beige in colour, with a dull, rough, pitted surface and a glossy brown domed operculum. Incubation takes about six months at room temperature. Eggs tend to mould easily, so it may be best to keep them only slightly humid, increasing humidity as hatching approaches.

Nymphs
These are quite large upon hatching with a body length of about 25mm. They are dark brown in colour, with flecks of white, and are very nervous, loosing legs easily within the first instar. They start feeding with no difficulty and seem to appreciate some humidity.

PSG 47, *Bacteria* sp.



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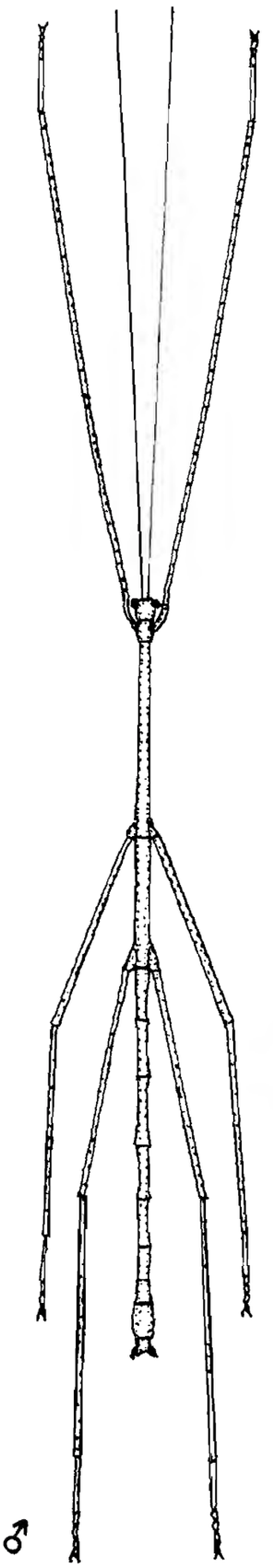


♂

10cm

As they grow, they assume many different shades of brown, some appear to be a rich chestnut colour. Nymphs often possess two horns on their heads but seem to loose these progressively as they mature.

Foodplants
Bramble, Rose, Hawthorn and Oak are all accepted readily.

General comments
A placid species with no real active defences. Adult females may produce a frothy liquid from their mouths if they feel really threatened. Both sexes tend to thrash around when handled, females often calm down when given something to hold onto, males can't be calmed and will storm around their cages for some time after being handled. Nymphs sometimes appear to have trouble extracting their legs from the exuviae during moulting, however this is generally a very easy species to keep.

The Phasmid Egg

John Sellick, 31 Regent Street, Kettering, Northants, NN16 8QG, UK.

Key words
Phasmida, Eggs, Egg terminology, Egg descriptions.

The phasmid egg has some special properties, being on the whole large and robust. So robust indeed, that eggs can be dissected from museum specimens over a hundred years old and externally they appear indistinguishable from those newly laid. There is no difficulty in keeping a collection, mounted or loose. But why bother? Because a proper knowledge of the egg is a great aid to the identification and classification of the adult animal. The eggs all have a distinct operculum and micropylar plate (even if - as in some *Dares* - the plate is almost invisible from the surface and is only clearly revealed by viewing the shell from inside). As far as is known, the phasmid egg is unique, no other insect having this combination of features, and no phasmid lacking them.

As long ago as 1871 Kaup published illustrations and descriptions of twenty six species, and put forward the suggestion that a study of the eggs would be a great help in classifying the insects. It is a pity that his illustrations were rather poor and his descriptions brief, although he had the example of J. Müller's (1825) much earlier splendidly detailed study of the egg of *Bacteria ferula*. Although there were casual references to Kaup's ideas, nothing systematic was done until over a century later when I set out the standard descriptive methods for phasmid eggs (Clark 1976) and described and figured the eggs of the few species then in culture, and incidentally coined the word *ootaxonomy* for the study of the value of eggs in classification. Since then I have made more extensive surveys, including a genus key (Clark 1979), a survey of leaf insect eggs (Clark 1978) and investigations of distribution and nature of the capitulum (Clark 1976, Sellick 1988) and the micropylar plate (Sellick 1987) within the order.

Why am I writing about this now? Because I am aiming to get together a comprehensive survey of all that is at present known about egg structure, combining my own work with that scattered through the literature. Quite a lot has appeared in the *PSG Newsletter*, and it would be interesting to see what the *Newsletter* has provided. Eggs of sixty three species have been figured, with degrees of usefulness varying from tiny indefinite sketches to large detailed drawings. Few have been illustrated from more than one point of view. Of the 120 plus PSG numbered species, only 47 eggs have appeared in any form in the *Newsletter*. Out there among the PSG members must be a mass of untapped material, waiting to make a contribution to scientific research. I am putting together a standard reference collection of mounted egg material, a full set for any one species being two intact eggs (mounted to show different views), a separate operculum, and a dissected egg to show internal shell structure. I have accumulated 118 species, but many are incomplete sets and for only 93 species do I know the eggs thoroughly.

Can I plead with anyone writing about eggs of a new species to illustrate both dorsal and lateral views (the latter conventionally with the micropylar plate to the left) and as well as the general description to give a series of standard measurements. Here is the standard descriptive method for phasmid eggs:

Dimensions should be given to the nearest 0.1mm. Remember when describing opercula and capitula to use height, width and length in the same sense as the main capsule. Thus what would instinctively be thought of as the height of a capitulum (distance from the operculum) should be referred to as its length. To describe eggs effectively requires more than a magnifying glass, and I recommend a lower power stereo microscope with a measuring graticule in the eyepiece. Many members may not have access to such an instrument, and in these cases I would be happy to receive material (empty, hatched eggs are quite suitable, but please include loose opercula) and

make the necessary examinations and drawings.

In describing eggs beware of using the term capitulum for any high-rise operculum. A capitulum is strictly separate from the operculum and will typically absorb warm alkali and swell up. Many are on stalks on the operculum, but some form a dome over the entire top. Some are solid, some are hollow (and these tend to collapse with age); some hollow ones are perforated on the surface. Many are a distinct colour from the capsule or operculum. The large structure of *Phyllium* spp. eggs is just a raised operculum. Also be careful about colour descriptions; it may well vary considerably in a single batch of eggs.

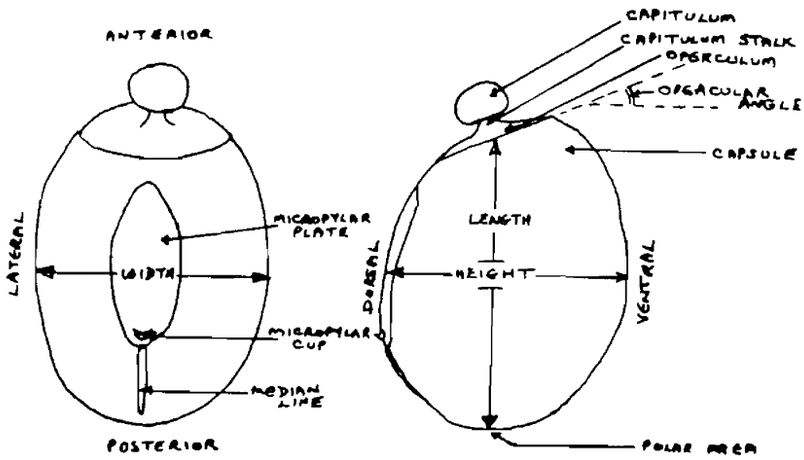


Figure 1. Illustration to show the terms used to describe eggs.

Egg capsule shape varies considerably throughout the order. Most are essentially spheres deformed to various extents, so that some end up almost as discs or cylinders. In general, apart from the opercular region, there is a smooth outline, though a minority of the eggs have posterior protrusions which in at least one case becomes a spike to stick the egg into the foodplant.

References

Clark, J.T. (1976) The eggs of stick insects (Phasmida): a review with descriptions of the eggs of eleven species. *Systematic Entomology*, **1**: 95-105.

Clark, J.T. (1976) The capitulum of Phasmid eggs (Insecta: Phasmida) *Zoological Journal of the Linnean Society*, **59**: 365-375.

Clark, J.T. (1978) The eggs of leaf insects (Insecta: Phasmida) *Zoological Journal of the Linnean Society*, **63**: 249-258.

Clark, J.T. (1979) A key to the eggs of stick and leaf insects (Phasmida). *Systematic Entomology*, **4**: 325-331.

Kaup, J. (1871) Ueber die Eier der Phasmiden. *Berlin entomol. Zeitschr.*, Berlin, **15**: 17-24.

Müller, A. (1825) Ueber die Entwicklung der Eier im Eierstock bei denn Gespenheuschreken... *Nova Acta Leopoldina* **12**: 553-672.

Sellick, J.T.C. (1987) The micropylar plate of eggs of Phasmatodea and its taxonomic significance. *Stick insects: Phylogeny and reproduction. Proceedings of the 1st international symposium on stick insects*, Universities of Siena & Bologna. p. 133-140.

Sellick, J.T.C. (1988) The Capitula of Phasmid eggs: an update with a review of the current state of Phasmid ootaxonomy. *Zoological Journal of the Linnean Society*, **93**: 273-282.

PSG 109, *Carausius abbreviatus* (Brunner)

Phil Bragg, 8 Cornwall Avenue, Beeston Rylands, Nottingham, NG9 1NL, UK.

Key words
Phasmida, *Carausius abbreviatus*, Borneo, Rearing, Foodplants, Distribution.

Classification

This species was first described as a member of the genus *Dixippus*, and as later moved to the genus *Phasgania* by Karny (1923). However both *Dixippus* and *Phasgania* are synonyms of *Carausius*, so the correct name is *Carausius abbreviatus*. The original specimens described by Brunner came from two areas of Sabah, Mt. Kinabalu and the Padas River. The species has only been mentioned five times:

Dixippus abbreviatus Brunner 1907: 280.
Phasgania abbreviata (Brunner), Günther, 1935: 8.
Carausius abbreviatus (Brunner), Bragg, 1990: 1.
Phasgania abbreviata (Brunner), Hausleithner, 1991: 231.
Carausius abbreviatus (Brunner), Bragg, 1992.

Culture history

The PSG culture developed from one female and several males which I collected in August 1989, on Mt. Serapi, Sarawak. When it was first collected the female was mistaken for a nymph of *Lonchodes jejunus* (Brunner). Although I have subsequently collected this species in several other areas of Borneo, most have been males and the original female is the only female that has reached the UK alive.

Distribution (fig 1.)

This species has been recorded from the eight localities marked on the map. (Bragg 1992) As these localities include both the eastern and western ends of Borneo it seems reasonable to assume that the species is quite widespread in northern Borneo.

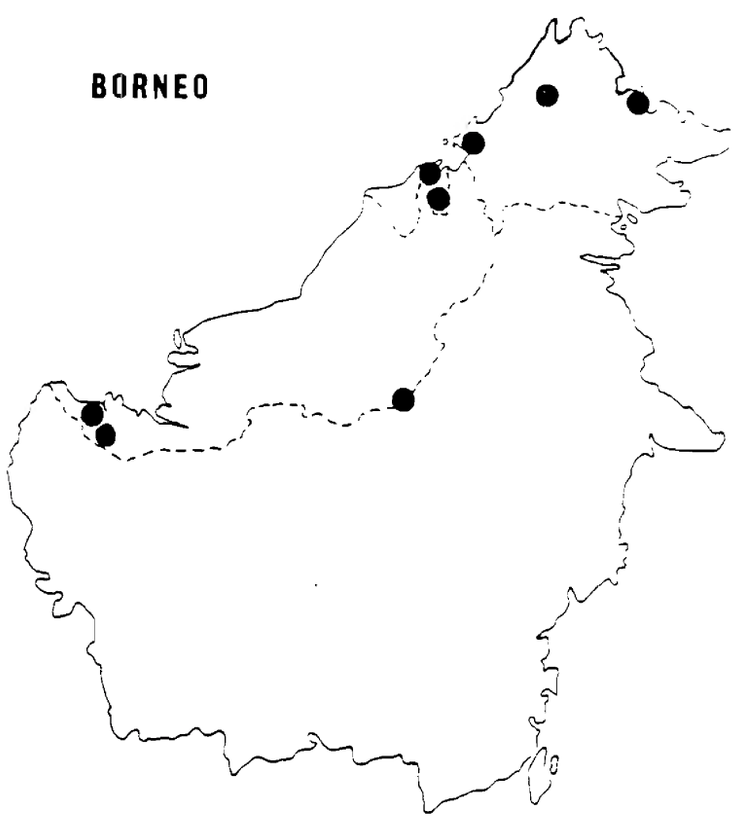
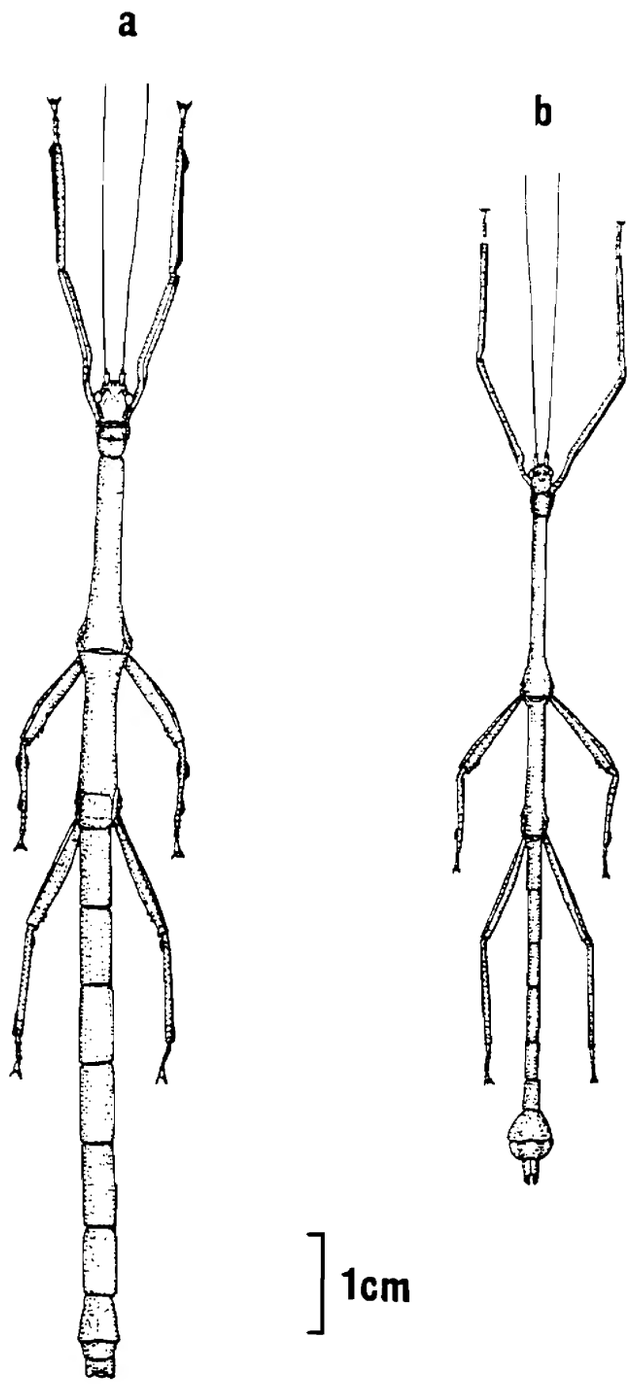


Figure 1. The known distribution of *Carausius abbreviatus* in Borneo.

Notes on wild specimens

A female specimen from Bengoh, 35km south of Kuching, was parasitized by a Mermithid larva and died a few days after capture (Bragg, in press). In 1989, on Mt. Serapi Patrick van der

Stigchel caught a phasmid which had half of its abdomen missing, although the distinctive end to the abdomen was missing, I believe that this specimen was a male *C. abbreviatus*. The phasmid had presumably been caught and had had the end of its abdomen eaten before it managed to escape. The insect concerned was dead by the following morning.



Description of the adults (fig. 2)
The females are best distinguished from related species by the very short hind legs. In most Lonchodinae, and certainly all those in culture at present, the hind legs of the females reach almost to the end of the abdomen, in this species they only just reach half way along. In the male the hind legs reach roughly three quarters of the way along the abdomen, in other Lonchodinae which are in culture the hind legs of the males are longer than the abdomen.

The females are a uniform brown. The body is quite granulose, particularly the thorax. The females appear similar to nymphs of *Lonchodes jejunus* or *L. brevipes*, but can easily be distinguished by the size of the hind legs. The middle tibiae have large rounded lobes, similar to those of *Carausius sanguineoligatus*. There are two bumps on the head which look like very blunt horns.

The males are quite a bright green when adult, with red patches where the legs join the thorax and a red end to the abdomen. The eighth and ninth segments of the abdomen are wide, about three times as wide as the rest of the abdomen; this forms a very distinctive round lobe. The males do not have the large lobes on the middle tibiae.

Figure 2. *Carausius abbreviatus*, a) female, b) male.

Nymphs
The presence or absence of the abdominal lobe and the lobes on the middle tibiae enable easy sexing of the nymphs when they are half grown. The male nymphs are brown so colour cannot be used to sex them.

Eggs (fig. 3)
The capsule is a uniform mid-brown in colour except for the area around the micropylar plate which is much darker. The capsule is covered in a series of raised ridges. The micropylar plate is an elongated oval with usually only a single zigzag or broken ridge running along it. The micropyle is located at the polar end of the micropylar plate. There is a noticeable median line running from the micropylar plate to the posterior pole. The operculum is smooth, flat and is a grey-brown colour. There is a black capitulum with a deep capitular pit. Typical measurements are: length 2.7mm, width 1.5mm, height 1.9mm and mass 3.91mg.

In a temperature which varied between 20°C and 15°C over a four week period, the egg laying rate of a single female was found to be 1.82 eggs per 24 hours.

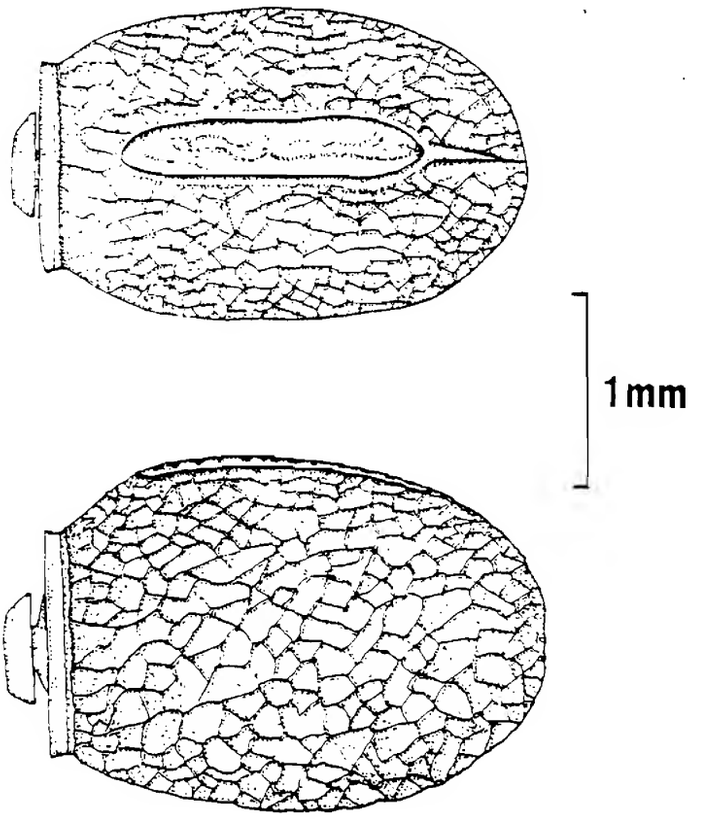


Figure 3. The egg of *Carausius abbreviatus*, dorsal and lateral views.

Sizes (mm)	Female.	Male.	Newly hatched
Total length	105-120	63-79	16
fore femur	15-17	12.5-14.5	3.0
mid femur	11-13	9-11	2.5
hind femur	12.5-14.5	11-12	2.7

Table 1. Size variation in *Carausius abbreviatus*.

Rearing
I have reared this species in the UK using one of my standard cages (Bragg 1987) maintained at a humidity of 70-90%. The time from the egg being laid to the insect reaching adult is almost exactly one year when kept in conditions with no heating other than sufficient to prevent temperatures falling below 5°C. The first captive bred generation were kept in a cage containing several other species and most of the nymphs died during the first instar. Three females and three males reached adult, one female died a few days later. The second generation nymphs were reared without other species in the cage and seemed to survive better than the first generation. The newly hatched nymphs are very fragile which could explain why the first generation was not very successful. Unfortunately, while I was abroad during the summer of 1991 all my stock died off. Although I had passed eggs on to other people, the culture seems to have died out. Hopefully I will be able to re-establish this culture with some fresh stock.

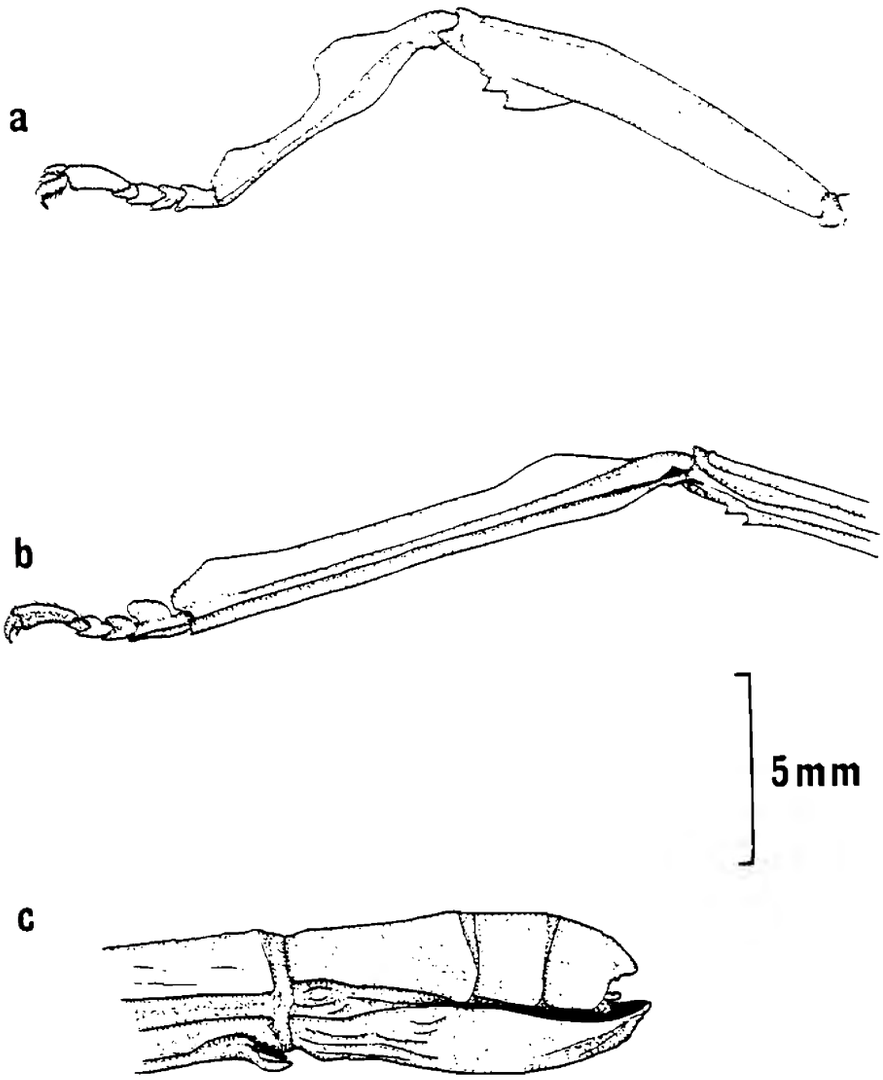


Figure 4. Female; a) mid leg, b) fore leg c) operculum.

Foodplants

C. abbreviatus will feed on bramble, wild rose, firethorn (*Pyracantha* sp.), eucalyptus (*E. gunnii*), raspberry and hawthorn.

References

Bragg, P.E. (1987) Cage construction. *Phasmid Study Group Newsletter*, 32: 8-9.

Bragg, P.E. (1990) Species list changes. *Phasmid Study Group Newsletter*, 45: 1.

Bragg, P.E. (1992) Notes and illustrations of the phasmid *Carausius abbreviatus* (Brunner) from Borneo, including a description of the female. *Entomologist's monthly magazine*, vol. 128.

Bragg, P.E. (in press) Parasites in Phasmida. *The Entomologist*,

Brunner von Wattenwyl, K. (1907) *Die Insektenfamilie der Phasmiden*. volume 2. Leipzig.

Günther, K. (1935a). Phasmoiden aus Centralborneo. *Arkiv för Zoologi*, **28A**(9): 1-29.

Hausleithner, B. (1991) Eine Phasmidenausbeut aus dem Gebiet des Mount Kinabalu, Borneo (Phasmatodea). *Nachr. ent. Ver. Apollo, Frankfurt*, N.F. **11**(4): 217-236.

Karny, H.H. (1923) Zur Nomenclatur der Phasmoiden. *Treubia*, 3: 230-242.

PSG 104, *Phaenopharos* sp.

Phil Bragg, 8 Cornwall Avenue, Beeston Rylands, Nottingham, NG9 1NL, UK.
Egg description and drawing by John Sellick.
Drawings of adults by E. Newman and Frank Hennemann.

Key words
Phasmida, *Phaenopharos* sp., Thailand, Rearing, Foodplants.

Classification

This species appears to be similar to *Phaenopharos struthioneus* (Westwood), the only species which has been described in this genus; PSG 104 is a much smaller species.

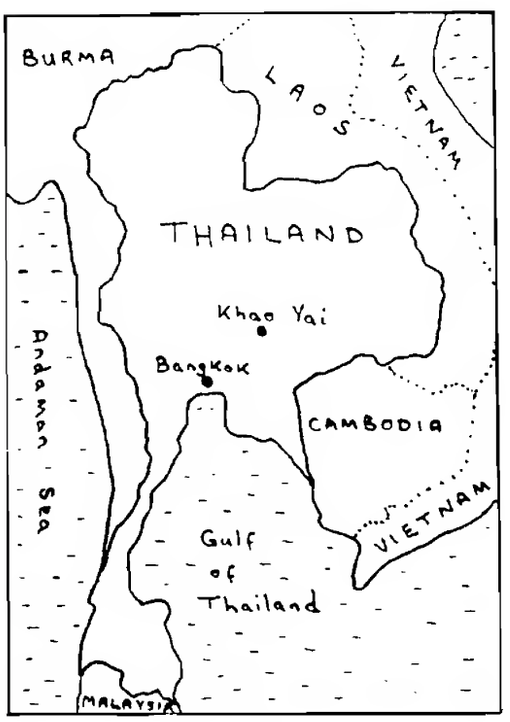


Figure 1. Map of Thailand.

Culture history

This culture originates from two females and three males which were collected in the Khao Yai National Park (fig 1.), Thailand by Heinz van Herwaarden and Oscar van Gorkom during August 1988. The collecting area has an altitude of 825m, annual rainfall of 1600-2400mm and at the time of collection a temperature ranging from 17°C to 23°C. The five specimens reached Europe alive and the species had already been distributed to quite a few members by July 1989 when I was given two mated females. This species has previously been illustrated and described as "Seventh species, Thailand red microwings" (Herwaarden 1989).

Description of the adults (fig 2.)

The most distinctive features of this species are the wings. There are no fore wings, only a small pair of hind wings on the metathorax. These are black or dark brown at the leading edge, the rest of the wing is bright red. The wings of the female are about 6mm long, those of the male are about 4mm. The wings are displayed when the insect is disturbed, especially if the end of the abdomen is firmly held. The basic colour of females ranges from pale fawn to almost black. Although the colouring appears constant along the length of the body, the females are in fact mottled with darker patches. Males are generally dark brown or black, fawn being less common than in the females and do not appear to be mottled. Females are about 10-12cm in length, males 9-10cm. The mesothorax and metathorax of the female are covered in small spines, these are present in the males as small granules. The femora are all quite flattened, particularly in the female. There are a pair of spines on the ends of the middle and hind femora, just before the joint with the tibiae, these are particularly noticeable in the male. The first segment of the front tarsi in the females have a large lobe which is absent in the male.

Egg (fig 3.)

Egg uniformly black to the naked eye. Magnification shows a dark grey micropylar plate and main capsule, with variable black patches laterally. Micropylar plate obscure, stretching almost the length of the dorsal surface. The operculum bears a black capitulum which is completely hollow and readily collapses. Typical measurements: length 3.4mm, width 2.5mm, height 3.0mm; capitulum length 0.5mm, width 0.8mm; micropylar length 3.0mm, width 0.7mm.

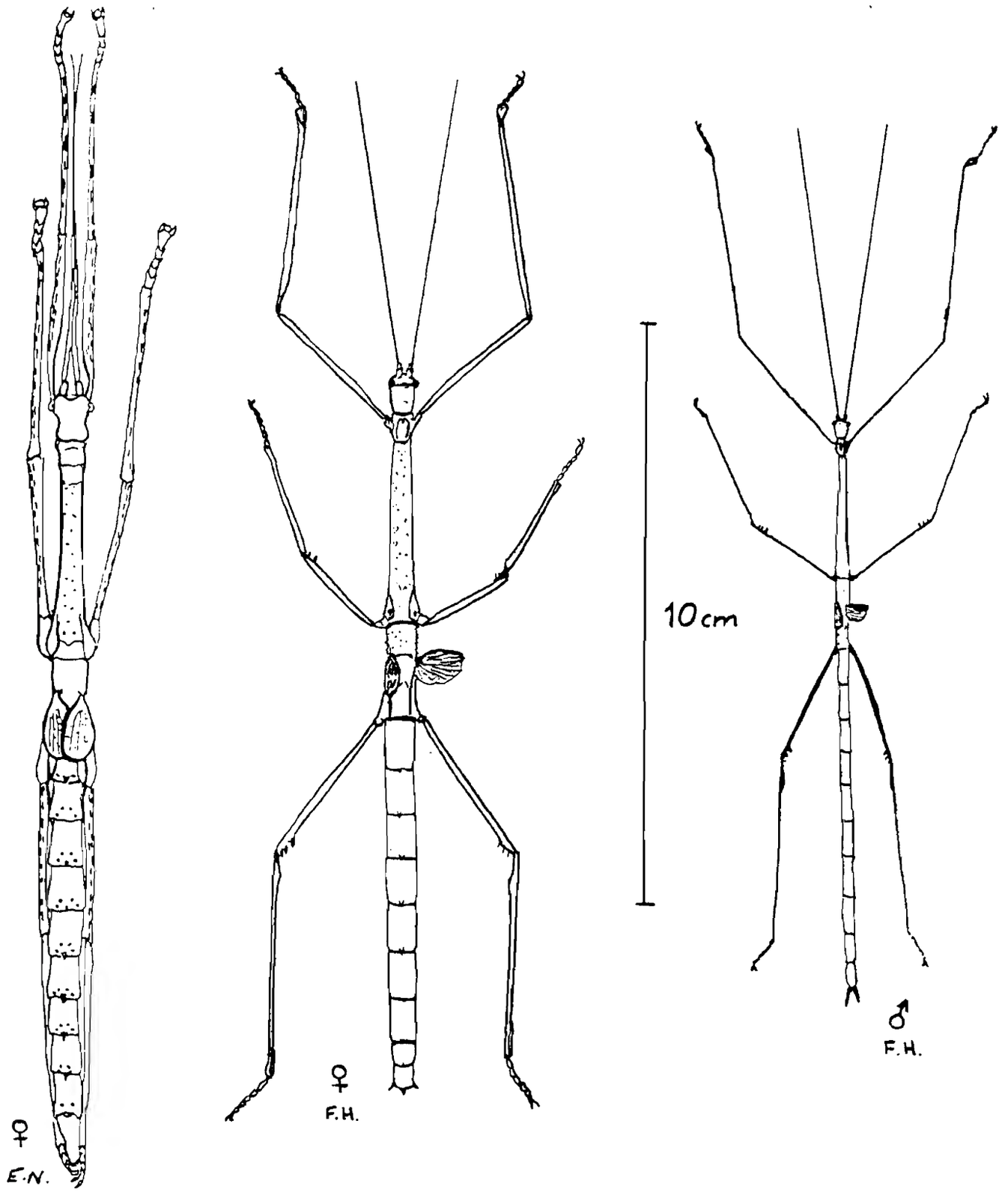


Figure 2. Females and male of PSG 104.

Behaviour

This species is nocturnal and commonly plays dead when handled during the daytime. However persistent handling causes them to "wake up" and try walking away. If the abdomen is gripped at this stage the bright red wings flash open, usually being held open for several seconds and sometimes for as much as half a minute. The contrast between the plain black or brown body and

the bright red is startling and could be very effective protection against predators.

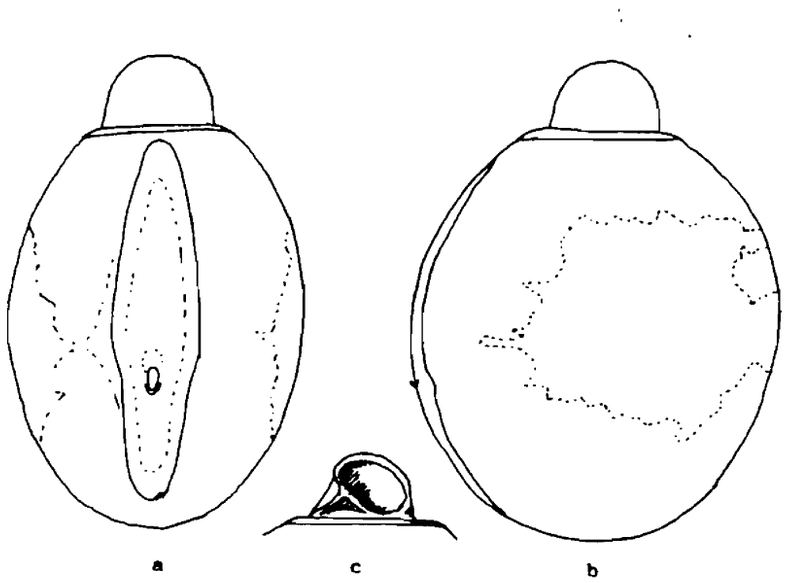


Figure 3. The egg of PSG 104, a) dorsal view, b) lateral view, c) collapsed capitulum.

Rearing

This is quite an easy species to rear and has become quite widespread. If kept in conditions which are not very well ventilated, there can be a high mortality at the penultimate instar and young adult stages. This species seems to do well in conditions of moderate humidity. The males are much less bulky than the females which explains why they reach adult so much quicker; often the females survive the males by a significant period. Although the eggs are black in colour, they are very easy to distinguish from the frass and, being round, are easily separated by using a small paint brush to roll them off a sloping piece of card.

Foodplants

These include bramble (*Rubus* spp.), raspberry (*Rubus idaeus*), dog rose (*Rosa canina*), firethorn (*Pyracantha* sp.), ivy (*Hedera* sp.), eucalyptus (*Eucalyptus gunni*), rhododendron (*Rhododendron* sp.), and oak (*Quercus* sp.).

References

Herwaarden, H. van (1989) Phasmatidae from Thailand. Part 2: Species found in Khao Yai National Park. *PSG Newsletter*, **41**: 15-19.

Phasmids on Praslin and La Digue Islands in the Seychelles

Pat Matyot, P.O. Box 321, Seychelles.

Key words
Phasmida, Seychelles, La Digue, Praslin, *Carausius alluaudi*, *C. sechellensis*, *Graeffea seychellensis*, *Phyllium bioculatum*.

Phasmids have been recorded from five granitic islands of the Seychelles archipelago. Information regarding which of the six species occur on each island has previously been summarized in tabular form (Matyot 1990). The data provided then for the islands of Praslin and La Digue were based on the literature and not on first-hand observation. Following a visit to Praslin and La Digue in October 1991, I am now able to update the distribution records for these two islands.

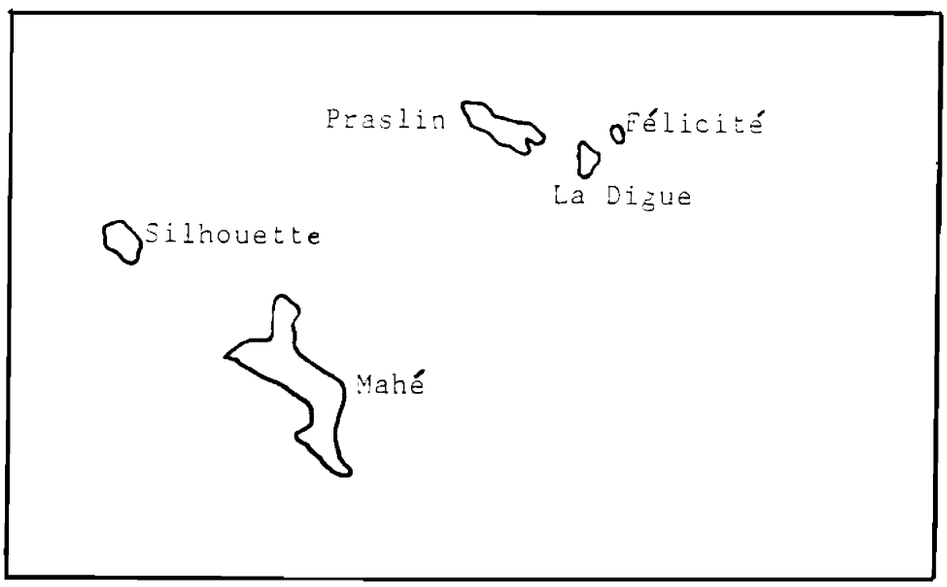


Figure 1. The islands of the Seychelles known to have phasmids.

Praslin

Alluaud discovered *Carausius sechellensis* (= *Lonchodes sechellensis*) on this island in 1892 (Bolivar 1895). The species was found again there in 1905 by Gardiner and in 1908 by Scott during the Percy Sladen Trust expeditions to the Indian Ocean. In 1908 Scott also collected *Graeffea seychellensis* on Praslin (Bolivar & Ferrière 1912). These two species were the only ones I observed during a five day stay on Praslin from 18th to 22nd October 1991.

As on Mahé, *C. sechellensis* is the species with the greatest altitudinal and habitat range. Four sightings of this phasmid were made:

1. At about 340m above sea level at Fond Azore, close to the highest point on Praslin (367m). This specimen was a nymph, possibly third instar. It was resting during daytime on one of the fronds of a young palmis palm, *Deckenia nobilis*. No ferns, the preferred foodplants of this stick insect, were visible in the immediate vicinity.
2. Near sea level on the edge of a mangrove swamp north of Cap Jean Marie at Anse Kerlan. This was a small nymph, probably second instar. It was resting during the day on a fouzer taba fern, *Nephrolepis biserrata*.
3. At about 80m above sea level, along the track from Baie Sainte Anne to Fond Dalbaretz. This was another nymph, probably third instar. It was resting at night on one of the fronds of a low lantannyen milpat palm, *Nephrosperma vanhoutteanum*. There were clumps of the fern *N. biserrata* growing close by.

4. At about 20m above sea level, along the track from Anse Volbert to Salazie. This sub adult male was resting in daytime on one of the fronds of a young coconut palm, *Cocos nucifera*. Clumps of *N. biserrata* were growing beneath the palm.

The palm stick insect, *G. seychellensis*, was observed on two occasions on Praslin:

1. At about 150m above sea level, along the track from Baie Sainte Anne to Fond Dalbaretz. Two adults, a male and a female (green form), were resting at night on different leaflets of the same frond of *N. vanhoutteanum*.
2. At about 100m above sea level, along the track from Anse Volbert to Salazie. A nymph, possibly third instar, was resting on a frond of *N. vanhoutteanum*.

The leaf insect *Phyllium bioculatum*, which is known to occur on Mahé and Silhouette, was not observed by me on Praslin, but several inhabitants have reported seeing leaf insects on the island. According to notes that E.S. Brown has left at the Hope Department of Entomology (Oxford University Museum), in January 1953 he came across a male of "*Pulchrifolium gelonus* (Gray)" (= *Phyllium bioculatum*) at Grand Anse on the west coast of Praslin (Graham Floater, personal communication). Since no specimens have been available for study and positive identification, the possible presence of *P. bioculatum* on Praslin is indicated by a question mark in

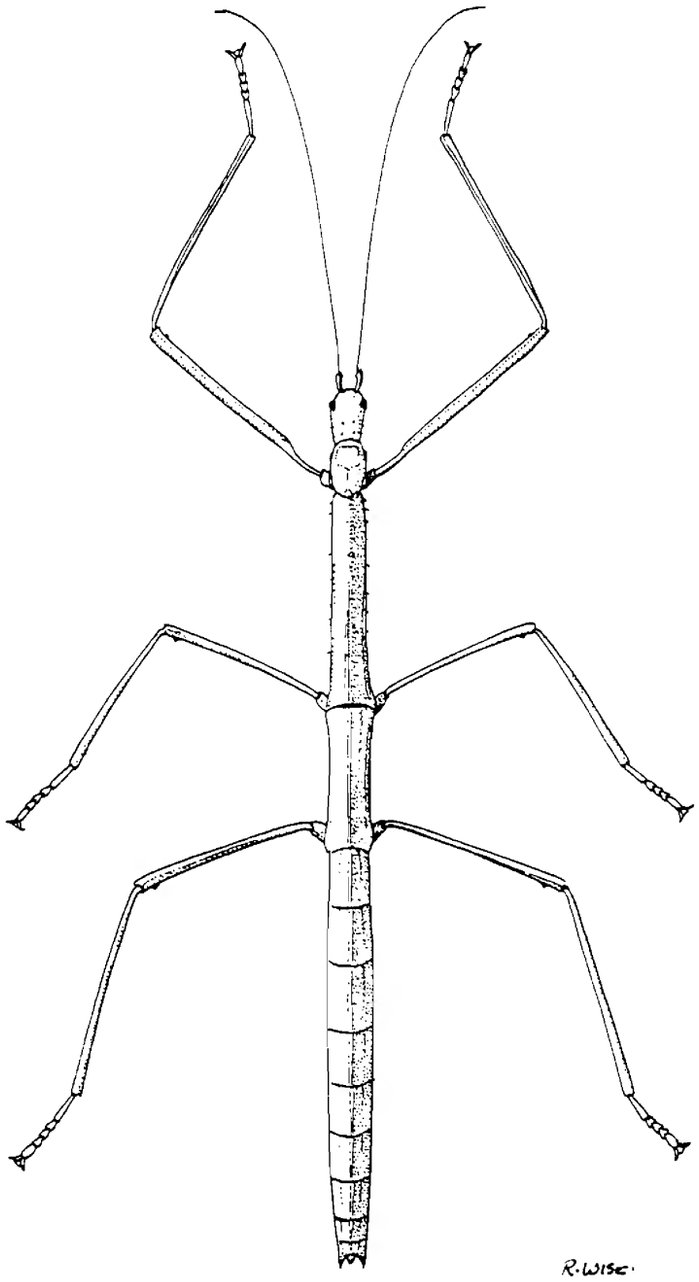


Figure 2. Female *Carausius alluaudi*, can reach 11cm in length. [drawing: Rosemary Wise.]

table 1.

Species	Mahé	Praslin	La Digue	Silhouette	Félicité
Carausius alluaudi	*	-	?	*	-
Carausius gardineri	*	-	-	*	-
Carausius scotti	-	-	-	*	-
Carausius sechellensis	*	*	*	*	?
Graeffea seychellensis	*	*	-	*	-
Phyllium bioculatum	*	?	-	*	-

Table 1. Distribution of phasmids in the Seychelles. * species present, - species not known to be present, ? species status uncertain.

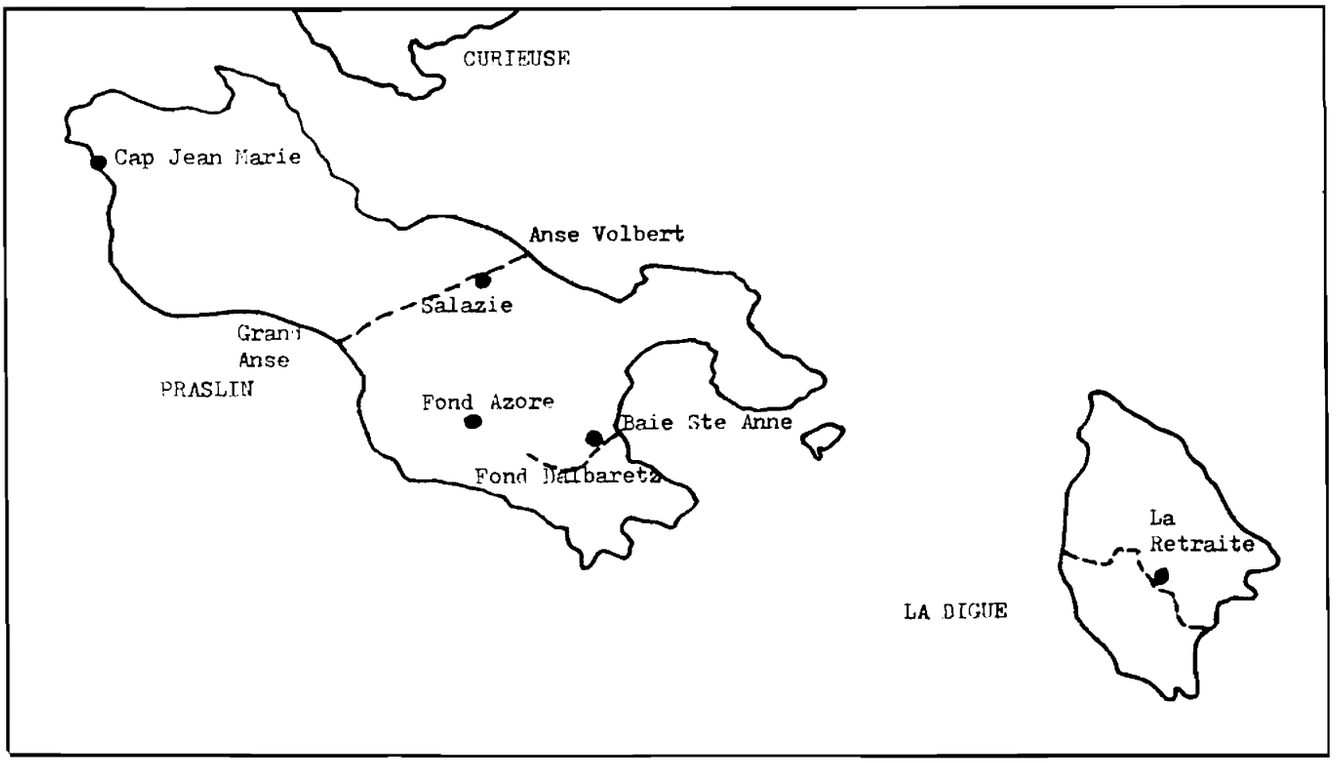


Figure 3. Map showing localities mentioned in the text.

La Digue

Alluaud discovered *Carausius alluaudi* (=*Lonchodes alluaudi*) on this island in 1892 (Bolivar 1895). Since then there have been no further studies of its phasmid fauna. One day, October 24th 1991, was spent looking around areas of La Digue where *C. alluaudi* was likely to be found, but

this search was unsuccessful. The time spent on the island was admittedly short, and the species may still survive in areas which could not be visited. Even so, it must be quite rare, since a large number of likely sites were investigated. These investigations did reveal the presence of *C. sechellensis*, a species hitherto unrecorded from La Digue. Only one specimen was sighted, an adult female which was resting on the fern *N. biserrata* on the eastern side of the road that runs through the La Retraite area, at about 40m above sea level. A Ceratopogonid biting midge was perched on the thorax of the phasmid.

Four other islands, Frégate, Cousin, Curieuse and Silhouette, were also visited in October 1991. Phasmids were not found on the first three, while all known Seychellois species, except *P. bioculatum* were located on Silhouette. The presence of *P. bioculatum* on Silhouette was however confirmed in 1990 (Matyot 1991).

In 1908 Scott found *C. sechellensis* on Félicité as well (Bolivar & Ferrière 1912), but since then the island has been subjected to severe habitat destruction, notably through the replacement of the original vegetation by planted coconut palms. The present status of *C. sechellensis* on Félicité needs to be verified.

References

Bolivar, I. (1895) Mission scientifique de M. Charles Alluaud aux îles Séchelles: orthoptères. *Annales de la Société entomologique de France*, **64**: 369-386.

Bolivar, I. & Ferrière, C. (1912) Phasmidae of the Seychelles. *Transactions of the Linnean Society of London (Zoology)*, **15**: 293-300.

Matyot, P. (1990) *Carausius scotti* re-discovered. *PSG Newsletter*, **44**: 6-7.

Matyot, P. (1991) Observations sur les phasmes de l'île de Silhouette aux Seychelles. *Le monde des phasmes*, **12**: 3-9.

Reviews and Abstracts.

Book Review.

by **Phil Bragg**.

A step-by-step book about stick insects. by David Alderton.
Published by TFH Publications. (1992) IBSN 0-86622-349-5. A5 format, 64 pages, 41 colour photographs. Price £2.25.

My initial impression of this book was a poor one. The title page has a photograph of a female nymph of *Extatosoma tiaratum*, the caption on the following page says "fully grown" which is clearly not the case as it has no sign of any wings. However as I looked further through the book I quickly changed my mind.

Aimed at beginners, it is well researched and includes technical information in a very readable form. The book is packed with photographs ranging from quarter to full page; while these are of a limited number of species, presumably those kept by the author, they greatly enhance the book in a way which drawings can never quite achieve. The introduction is packed with interesting facts and this is followed by sections on housing, feeding and care, breeding, species available, and an index. It even mentions the Phasmid Study Group in the first paragraph, as well as helpfully including a contact address at the end of the book.

The introduction is in fact quite a large section and offers insights into phasmids generally, predators, pest status, ways to obtain livestock, methods of transporting or posting them, and basic anatomy. I found an excusable error on page nine, there are in fact three established species in the wild in the UK; as the presence of the third species has only come to light recently (Brock 1986), the error is understandable. What impressed me most in the introduction is that the author avoided the trap that every other author has fallen into, beginners do not want to know the technical names of every part of an insects body! The basic anatomy is just that and no more.

The housing section is reasonably comprehensive, offering various options, all are suitable although it does not suggest my own favourite, a glass fronted, net cage. Heating is discussed, I disagree with the suggestion that the insects might sit on a light bulb and burn themselves, but I agree that is not a good method; as the book states, heating pads are the most suitable method if it is necessary.

I know I keep more phasmids than the average enthusiast, but even so I doubt if it is worthwhile trying to grow a supply of bramble in your garden for use in winter. Contrary to the suggestion in the book, I do find it worth growing *Pyracantha* as winter food, it keeps its leaves better than bramble. One strange thing is the suggestion that the foodplants, even when put in water, may wilt after two or three days; mine lasts two or three weeks without wilting. The two paragraphs on cleaning the cage, advising regular, frequent, cleaning with which I agree, however I do know people who successfully rear stick insects by leaving eggs and droppings in the cage, only cleaning it once per year. The advice on water and humidity is consistent with the housing suggestions (although again not my preferred methods). The handling, diseases, and euthanasia suggestions are very sound advice.

The chapter on breeding is a little deceptive in places; 1000 eggs is normal for *E. tiaratum* in Australia but not in Europe, 450 is more realistic (Carlberg 1987: 54). A yogurt pot (except perhaps a family size pot) is not a suitable container for egg laying medium for a species as large as *Eurycantha calcarata*, a one or two litre ice cream container is more suitable. There is only one

photograph of eggs and this is of only one species; this is surprising in a book with such an excellent range of photographs. Contrary to the author's belief, many inexperienced people have difficulty recognising eggs. Although there is a multitude of suggestions for egg laying media, there are no suggestions on the alternative methods of incubating eggs. However, apart from these points, the chapter covers breeding quite well, with a variety of ideas, a welcome change from the common practice of plugging only the authors' personal preferences.

The short section on individual species recognised both that there are many species in culture, and that only a limited number are widely available. It makes specific mention of six of the most frequently available and then briefly mentions a few others. There are a few minor errors: a common one in other places also creeps into this book, Mackay's Spectre should of course be Macleay's from *E. tiaratum* (Macleay) 1827; *Eurycantha calcarata* is misspelt as *E. calarata*; the colour of *Calynda brocki* is given as chocolate brown, in my experience green or fawn are more usual; *Creoxylus spinosus* 10cm long would be worth seeing, I checked my collection and found my largest specimen is 5.7cm long.

The classic, inexcusable blunder I have saved until the end; page 43. Why must people insist on printing photographs of *E. tiaratum* upside down? To compound the fault, the same picture is on the back cover.

Having catalogued all the errors I've found, I must make my feelings clear. This is an excellently written, attractively presented book which is ideal for beginners. It is published by a company which is probably the largest publisher in the pet trade and has a huge number of shops stocking their titles. It is likely to become the best selling book on stick insects and deservedly so. Given the cost, the number of colour photos, the readability and the range of methods suggested this must be the best buy for beginners. If the price remains at this level, there can be no excuse for every would-be stick insect keeper not buying a copy. As the book is aimed at beginners it is limited in the number of species that it covers but will still make interesting reading for experienced phasmid rearers.

References

Brock, P.D. (1986) A third New Zealand stick insect (Phasmatodea) established in the British Isles, with notes on the other species, including a correction. *Proceedings of the 1st International Symposium in Stick Insects*. 125-132.

Carlberg, U. (1987) Culturing stick- and leaf-insects (Phasmida) - A review. *Z. Versuchstierkd.*, 29: 39-63.

Phasmid Abstracts

The following abstracts briefly summarise articles which have recently appeared in other publications. Some of these may be available from local libraries. Others will be available in university or college libraries, many of these libraries allow non-members to use their facilities for reference purposes free of charge.

The editor of *Phasmid Studies* would welcome recent abstracts from authors so that they may be included forthcoming issues. In the case of publications specialising in phasmids, *Phasma* and *Le monde des phasmes*, only the longer papers are summarised.

Alderton, D. (1992) *A step-by-step book about stick insects*. TFH Publications. 64pp.
[Reviewed in this issue of *Phasmid studies]*

Baarda, G. (1991-2) Voer!!! *Phasma*, **1(4)**: 8-11, continued in *Phasma* **2(5)**: 6-9.
This is a comprehensive summary of foodplant data from *PSG Newsletter* issues 1-48 and *Phasma* issues 1-3. The data is tabulated, grouping the foodplants by genus rather than by species, this is done as the records are not always very precise and a complete list would be too unwieldy. Part one summarises known foodplants in the Rosaceae but sub-dividing them into three families, Amygdalaceae (Plum & cherry), Rosaceae (Rose & Bramble) and Pomaceae (Apple). Part two deals with the rest of the known foodplants in the families Araliaceae, Betulaceae, Ericaceae, Fagaceae, Myrtaceae, Oleaceae, Papilionaceae, Polygonaceae, Commelinaceae, Moraceae, Ulmaceae, Berberidaceae, Hypericaceae and Caprifolaceae. Ferns are also mentioned as foodplants of two species. In addition other foodplants have been mentioned but only for single species. A total of 410 phasmid-foodplant combinations have been mentioned.

Bragg, P.E. (1992) The use of stick insects in schools. *School Science Review*, **73(264)**: 49-58.
Some uses of stick insects in schools are outlined and suitable species are listed. The general nature and variation of stick insects is discussed. Some species are illustrated. Some useful facts, references and sources of further information are given. A copyright free care sheet and cage construction details are provided.

Bragg, P.E. (1992) Phasmids and cockroaches as prey of spiders and mantids. *Bulletin of the Amateur Entomologists' Society*, **51(380)**: 19-20.
Records of predation of stick insects in the wild are rare. The records of spiders and preying mantids are reviewed. A possible case of predation by a mantis is reported. Two colour photographs are included, one shows a spider eating a female nymph of *Asceles margaritatus*, the other shows a cockroach being eaten by a spider.

Bragg, P.E. (1992) Illustrations and notes on the phasmid *Diesbachia hellotis* (Westwood) from Borneo, including a new synonym. *The Entomologist*, **111(2)**: 95-101.
The male and egg of *Diesbachia hellotis* are illustrated for the first time. A correction is made to the description of the female which is also illustrated. The male has previously been described as *Diesbachia approximata*. The nymphs of this species are briefly mentioned. The taxonomic status and distribution are discussed.

Brock, P.D. (1992) *Rearing and studying stick and leaf insects*. AES Publications.
A revised edition of *The phasmid rearer's handbook* which was published in 1985.
[This book will be reviewed in the next issue of *Phasmid Studies]*

D'Hulster, K. (1992) Waarvoor wandelende takken allemaal gebruikt worden! *Phasma*, **2(5)**: 10-12

Narrates a variety of facts and some of the uses of phasmids, listing a total of 17. The list includes medicinal uses, education, stage props, live food for predators, pest status, and noise production.

Gorkom, J. van (1991) Soortbeschrijving Phasmatodea. *Phasma*, **1(4)**: 4-5.

A species report on rearing PSG 103, *Sipyloidea* sp., with a brief description. This species was originally collected in the Khao Yai National Park in August 1988. The article concludes that this is a good species for beginners to attempt rearing. Illustrations of male, female, egg and map of Thailand by Heinz van Herwaarden.

Gorkom, J. van (1991) Wintergroen. *Phasma*, **1(4)**: 6-7.

Discusses some of the problems and solutions to finding food in winter. The foodplant list on the PSG species list is far from complete and rearers are advised to try new foodplants. *Phenacephorus cornucervi*, *Lonchodes amaurops* and *Phaenopharos* sp. (PSG 104) will all eat ivy. *Lonchodes brevipes* will eat rhododendron. Bramble remains the main source of food in winter and can usually be found in covered areas such as woods. *Viburnum rhytidophyllum* is an evergreen found in parks and gardens and is worth trying as a foodplant. The article ends by advising keeping phasmid numbers low in winter.

Gorkom, J. van (1991) Een eerste kennismaking. *Phasma*, **1(4)**: 14-15.

Describes catching a small wingless phasmid in Taman Negara National Park in West Malaysia in October 1991. The egg and female are illustrated.
[from the illustration I suspect that this is *Abrosoma* sp. - P.E. Bragg]

Gorkom, J. van (1991) Soortbeschrijving Phasmatodea. *Phasma*, **2(5)**: 14-15.

A species report on *rearing Sipyloidea sipylus* (Westwood), PSG 4. The article concludes that this is an easy species to rear and it may be kept outside in the summer.

Gorkom, J. van (1991) Nieuwe phasmiden: een Lombokker. *Phasma*, **2(5)**: 20.

A report on a new culture of an unidentified wingless phasmid of the subfamily Phasmatinae. A single female was collected, by locals, on the south facing side of Gunung Rinjani, near Tetebatu, Lombok. A total of 14 eggs were laid between 30th September and 4th September 1990. These hatched between 6th and 12th December 1990. Seven nymphs of the thirteen that hatched managed to feed; of these, four females and two males developed into adults. Two of the females laid eggs and in the next generation 4 four male and four females survived to adult. Culturing this species is proving to be a problem in winter as the only known foodplant is oak. The following description is given: ♀ width 14.5cm, width 7mm, head 8mm x 6mm, green with a light brown abdomen; ♂ length 9.5cm, width 3mm, thorax red-brown, abdomen light brown.

Potvin, W. (1991) Kweekervaringen met enige wandelende takken. *Phasma*, **1(4)**: 12.

Mentions some problems with incubation of phasmid eggs. Incubation in closed tubes is not successful, mould develops on the eggs, particularly with *Sipyloidea sipylus*, *Baculum extradentatum and B. thaii*; *Carausius morosus*, *Libethra regularis* and *Phaenopharos* sp. (PSG 104) do not seem to be affected.

More spermatophores produced by Lonchodinae.

P.E. Bragg, 8 Cornwall Ave, Beeston Rylands, Nottingham, NG9 1NL, UK.

Key words
Phasmida, Spermatophore, *Lonchodes validor*, *Phenacephorus cornucervi*.

In April 1991 I reviewed the occurrence of spermatophores in phasmids (1991a), reporting a total of 18 species which produce spermatophores. Later the same year, in September (1991b), I reported finding a spermatophore in another species, *Haaniella grayi grayi* (Westwood). Since then I have found a further two species producing spermatophores.

In July 1991 I saw a first generation captive bred male of *Phenacephorus cornucervi* Brunner with part of a spermatophore protruding from the right hand side of its terminalia. As with most spermatophores that I have found, it was creamy white in colour. Although I have reared several hundred *P. cornucervi* over several years, this is the only spermatophore I have seen from this species.

On 16th May 1992 I noticed a small glossy white object protruding from the terminalia of a mating pair of *Lonchodes validor* (Brunner). The specimens had been given to me as nymphs by Mel Herbert who had collected their parents in Brunei during August 1991. Although I was reasonably sure that what I was looking at was a spermatophore, after watching the insects for a few minutes I decided to try removing the object in order to be certain. Using a fine pair of forceps, I gently pulled the object; it pulled away very easily. The spermatophore was soft and flexible, the contents were white, the spermatophore itself was transparent. I then put the spermatophore back in the position from which it had been removed. The following morning however, it was lying on the floor of the cage, still full.

Later in the same week I found the dried remains of another spermatophore on the floor of the cage. This cage is shared by several adult pairs of *Lonchodes haematomus* (Westwood) and *L. validor* so the origin of this spermatophore is uncertain.

This brings the total number of spermatophore records in the subfamily Lonchodinae to five. In view of the number of people keeping members of this subfamily in captivity, it is surprising that more have not been recorded. Some species seem more likely than others to drop spermatophores on the floor of the cage (eg. *Extatosoma tiaratum*) and therefore are more likely to be noticed. It is possible that not all spermatophores are as large in relation to the size of the insects as those which have been recorded. Another possibility is that most females are quicker at taking the spermatophore into their body than the species which have been recorded. I have reared more than two hundred *Lonchodes amaurops* Westwood, but have never found any spermatophores in this species although at least two other members of the genus produce them.

References

Bragg, P.E. (1991a) Spermatophores in Phasmida. *The Entomologist*, **110(2)**: 76-80.
Bragg, P.E. (1991b) More spermatophores in Phasmida. *The Phasmid Study Group Newsletter*, **48**: 8.

PSG 118, *Aretaon asperrimus* (Redtenbacher)

Paul Jennings, 14, Grenfell Avenue, Sunnyhill, Derby, DE3 7JZ. U.K..
Taxonomic and distribution notes by P.E. Bragg.
Illustration of male by E. Newman.

Key words
Phasmida, *Aretaon asperrimus*, Breeding, Rearing.

Classification

This species was originally described as *Obrimus asperrimus* by Redtenbacher in 1906. In 1938 Rehn & Rehn established the new genus *Aretaon* (1938: 419), with *asperrimus* as the type species.

I have examined the type specimens of this species and *A. muscosus* Redtenbacher, which are all in Vienna, and I found that the type specimens of *A. asperrimus* are all adults while those of *A. muscosus* are all nymphs. *A. muscosus* is distinguished by having more prominent spines, particularly on the front tibiae and the top of the abdomen. However, having reared *A. asperrimus* it is clear that nymphs of this genus are very spiny and these spines in particular are reduced when the insect becomes adult. It is therefore quite likely that *A. asperrimus* and *A. muscosus* are the same species. This possibility was considered and rejected by Günther (1935: 123) but as he had not reared them he would not have known that the spines are reduced when the insects become adult. The species in culture is clearly *A. asperrimus*, however it has smaller spines than the type specimens so clearly the species is variable. The type specimens of *A. muscosus* are much more spiny than those in culture, I cannot therefore be certain that *A. asperrimus* and *A. muscosus* are the same species. As there is a strong possibility that they are the same species, I am listing the published references and distribution records for both species.

Obrimus asperrimus Redtenbacher, 1906: 41, pl. I figs 4 & 5.
Obrimus asperrimus Redtenbacher, Dohrn, 1910: 398.
Obrimus asperrimus Redtenbacher, Günther, 1935: 123.
Aretaon asperrimus (Redtenbacher), Rehn & Rehn, 1938: 421.
Aretaon asperrimus (Redtenbacher), Bragg, 1991a: 76-80.
Aretaon asperrimus (Redtenbacher), Bragg, 1991b: 18-21.

Obrimus muscosus Redtenbacher, 1906: 41.
Obrimus muscosus Redtenbacher, Günther, 1935: 123.
Aretaon muscosus (Redtenbacher), Rehn & Rehn, 1938: 422.

Distribution

A. asperrimus was originally described from Mt Kinabalu, Sabah, Borneo. It has also been recorded from Labuan, off the north coast of Borneo (Günther, 1935: 123), and from Luzon in the Philippines (Rehn & Rehn, 1938: 422).

A. muscosus is recorded from: Mt Kinabalu (Redtenbacher 1906: 41) and Labuan (Rehn & Rehn, 1938: 422). I found a single male specimen at Kuala Belalong in the Temburong District of Brunei in August 1991, in addition to those mentioned below.

Origin of culture

The culture originates from several specimens collected at Poring Hot Springs, Mount Kinabalu National Park, Sabah, by Phil Bragg, C L Chan and myself in July 1992.

Geographical and climatic details
Poring Hot Springs is at an altitude of about 2500 feet (760 meters) above sea level. The temperature during the evening that we were there was 25°C and the humidity was 70-80%.

Adults
Both sexes are wingless. Table 1 contains the major measurements of my wild caught specimens. Measuring seven male and four female first generation captive bred specimens gave the following range of sizes: males 47-58mm, females 78-81mm.

Female (Fig 1)
The adult female is a plump, robustly built, non stick-like insect. On top of her head, there are two crest like ridges. These ridges consist of a series of spines, which are fused at the base. The top centre region of the head is covered with a number of small black shiny, pimple-like protuberances. The eyes are black, and mottled with yellow. Her antennae are moderately long and ordinary.

On the dorsal surface of the thorax there are four symmetrically positioned, outwardly pointing raised areas. This is a very characteristic feature, and distinguishes this species from any other in culture. These raised areas consist of a cluster of spines with a common base, each terminating with a pointed conical spine, about 2mm long. These spines, which resemble thorns of a hawthorn bush, are burgundy in colour. There are also four other pairs of spines on the upper thorax, two pairs on the prothorax and two pairs on the mesothorax.

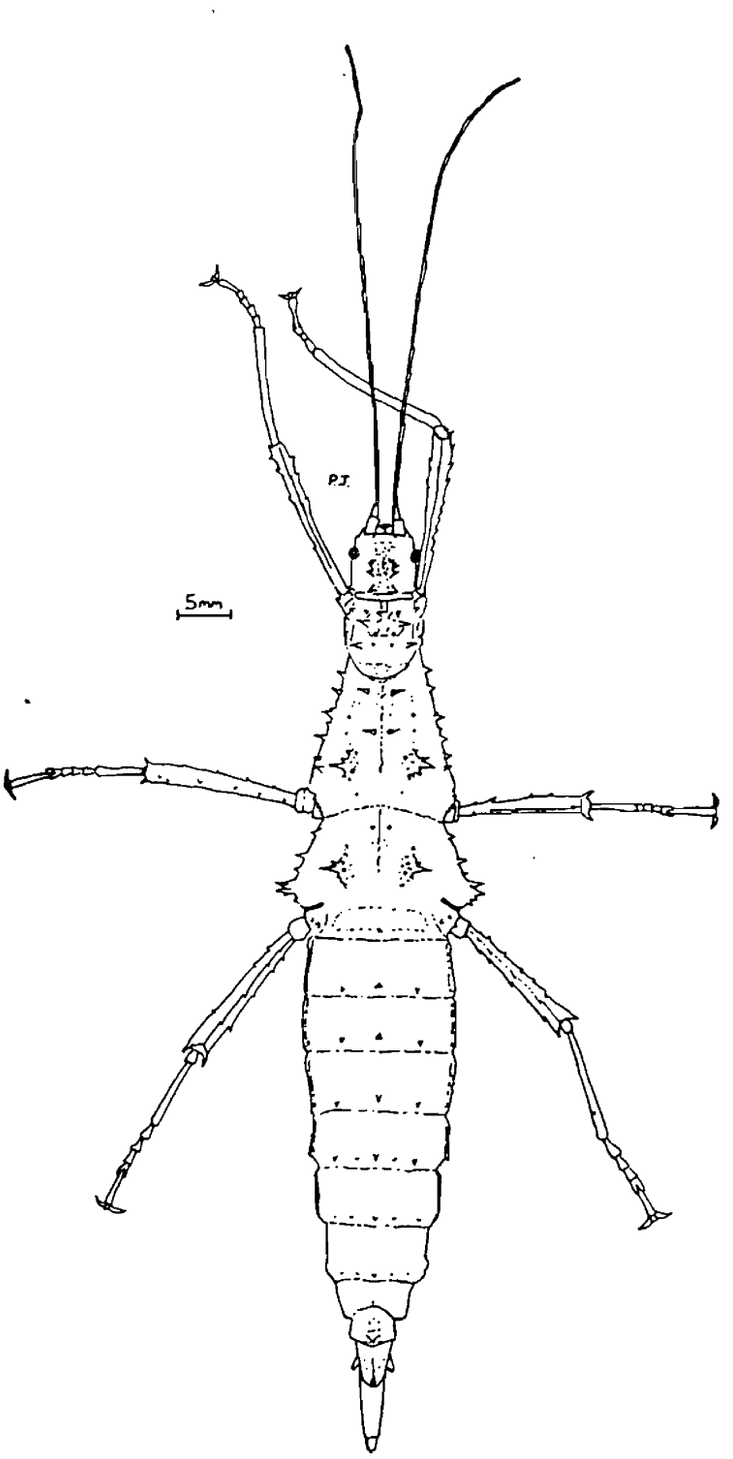


Figure 1. Female *A. asperrimus*.

In comparison to her thorax, her abdomen is quite smooth. The dorsal surface of the abdominal segments have three rows of backwardly pointing spines, one spine, per row, per segment. The abdomen terminates with a upwardly curved, sharply pointed ovipositor, about 10mm in length. The top and

bottom parts match each other closely. The cerci are just visible.

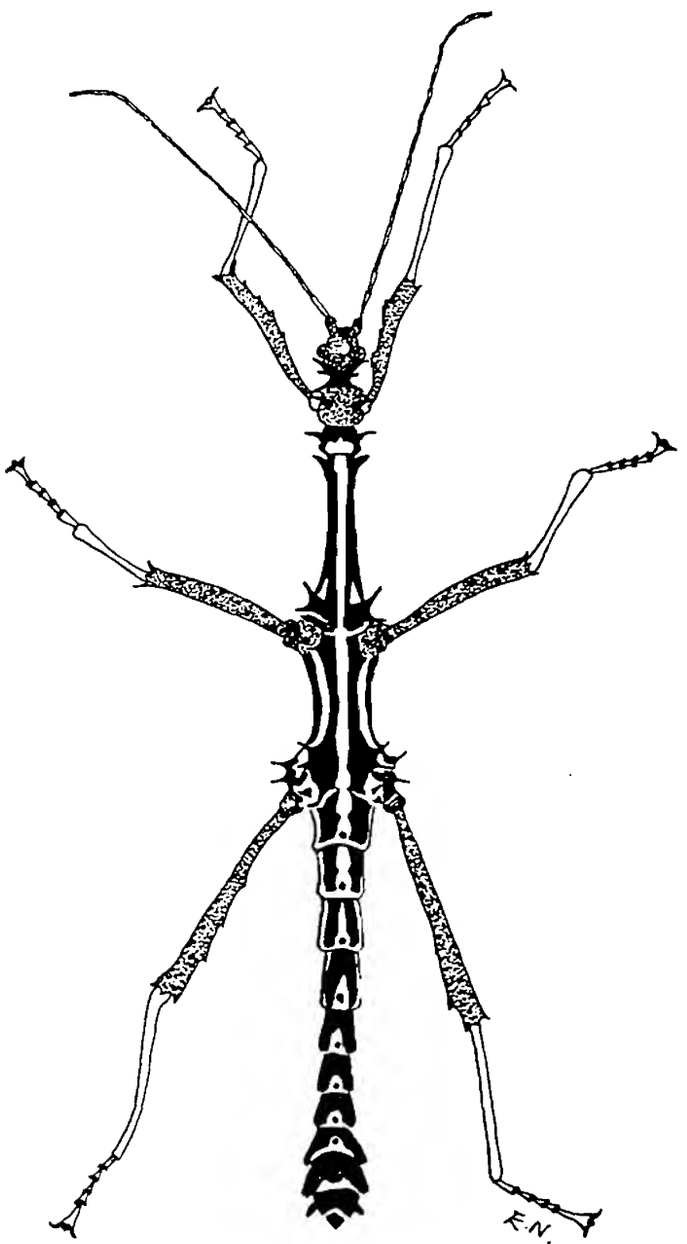


Figure 2. Male *A. asperrimus*.

The entire under surface of her body is spineless, but there is a scattering of small dark tubercles. All three pairs of legs are thick and strong and similar in appearance. The femurs are spined. The hind legs feature the largest spines, but they are not sufficiently strong to inflict pain on humans.

There is little colour variation between adult females reared in identical conditions. The base colour of the dorsal surface is a dark chocolate brown. This base colour is interspersed with lighter beige markings and patterning, including a fine central stripe on her thorax. The under side of the body is a lighter tan colour, particularly so on her thorax. The coloration of specimens that I have reared in captivity is very similar to that of the wild caught specimens. It has been noticed that adults reared in drier conditions are lighter in colour.

Male (Fig 2)

The male is a smaller, more slender, but a robustly built insect. The general formation and location of his spines are very similar to those of the female. The exceptions to this are the presence of only three pairs of spines on the thorax, instead of four and only a single row of spines on the upper surface of the abdomen. The four raised areas are similar in size to those of the female, giving the male a more thorny appearance. The tip of his abdomen is blunt and bulbous. The legs and their spine formations are similar in appearance to those of the female.

His ground colour is a dark chocolate brown. There is a central beige dorsal stripe and another along each side, running along the thorax and part of the abdomen. The entire under surface of his thorax is beige apart from the small, randomly distributed dark pimples. The under surface of his abdomen is a light tan.

An interesting feature of this species is that the male is frequently observed riding around on the back of the female (as was the adult pair that I found in Sabah), but without any signs of mating taking place.

Eggs (Fig 3)
This is a is slightly flattened cylinder, almost flat at the operculum end and approximately hemispherical at the other. The surface is smooth and a matt charcoal grey. Typical dimensions are length 5.5mm, depth 3mm and width 2.5mm.

At eight times magnification the surface can be seen to be pitted, like those of *Acrophylla wuelfingi*, but much finer. The micropylar plate has the curious four arm shape, similar to the related *Heteropteryx dilatata* and *Haaniella* spp. The micropylar plate has two forms.

Type 1 The two bottom arms of the micropylar plate go all the round and fuse together.
Type 2 The two bottom arms of the micropylar plate do not go all the way round.

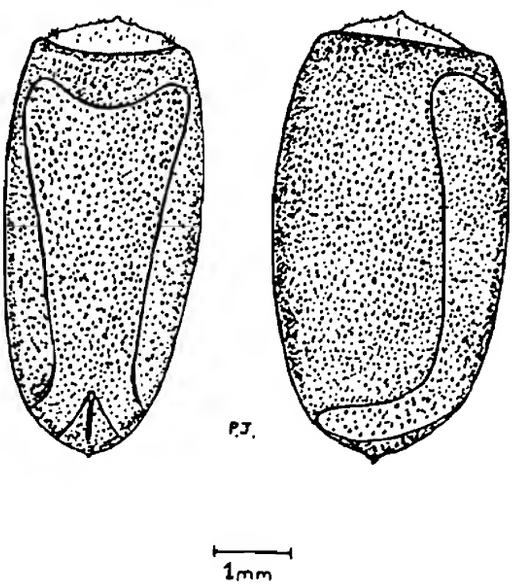


Figure 3. Egg of *A. asperrimus*.

The eggs are buried in the substrate. Eggs are often found in the tissue paper used to plug gaps between the food plant and water container.

The female begins to lay eggs about four to five weeks after becoming adult. The eggs are laid at a rate of about one or two per 24 hours, presumably they are deposited individually. The eggs take approximately 12 to 13 weeks to hatch when kept at 22-26°C.

Nymphs
Newly hatched nymphs are very lively and start to feed easily. At this stage there is little colour variation, a medium brown, and it is not possible to determine the sex.

The nymphs grow quite quickly. I recorded twenty two days between the first and second instar. By about the third instar it is easy to distinguish sexes, the most obvious differences being the developing ovipositor at the tip of the female's abdomen. As the nymphs mature, they gain markings, becoming more colourful and showing some variation. The penultimate female instar is perhaps the most beautiful stage. The dorsal surface has an almost velvet like appearance and is intricately marked, with colours ranging from dark brown to fawn.

Approximately 85% of nymphs survive to adulthood. Males mature more quickly than females, progressing through one instar less. The adults collected lived for about nine months. First generation adults lived for a similar period of time.

Defence

The primary form of defence appears to be remaining still and relying on camouflage. Presumably they would be best suited to resting amongst dead twigs and branches or on bare branches on living trees. Once disturbed both nymphs and adults can move quickly until they find an alternative place to hide. Other members have noted that this species likes to hide whilst resting, for example inside a cardboard tube.

Young nymphs arch their abdomens up over their backs, as do other phasmids, feigning a threat to sting. When handled, I have observed that adult females excrete a clear fluid from a pair of glands on the prothorax. This does not appear to cause any irritation or have any smell.

Lengths (mm)	Male	Female
Body & Head	55	86
Antenna	38	46
Fore legs	31	40
Mid legs	28	35
Hind legs	37	48

Table 1. Sizes of my wild caught *Aretaon asperrimus*.

Foodplants

I have only tried bramble, oak and evergreen oak, all of which was readily eaten. The specimens collected in Sabah were found on a variety of plants, including a plant similar in appearance to bramble.

General comments

An easy species to rear when kept at about 24 to 30°C and fairly humid. I have used cylinder cages with minimal ventilation to rear several generations. It is a lovely medium sized, non stick-like insect, and suitable for beginners.

References

Bragg, P.E. (1991a) Spermatophores in Phasmida. *Entomologist*, **110**(2): 76-80.

Bragg, P.E. (1991b) Spermatophores chez les Phasmida. *Le Monde des Phasmes*, **14**: 18-21.

Dohrn, H. (1910) Beitrag zur Kenntnis der Phasmiden. *Stettiner Entomologische Zeitung*, **71**: 397-414.

Günther, K. (1935) Uber einige Phasmoiden aus der Sammlung des Herrn Dr. C. Willemse, Eijgelshoven. *Natuurhistorisch Maandblad*, **24**: 123-126, 138-140.

Redtenbacher, J. (1906) *Die Insektenfamilie der Phasmiden*. volume **1**.

Rehn, J.A.G. & Rehn, J.W.H. (1938) The Orthoptera of the Philippine Islands, Part I. - Phasmatidae; Obriminae. *Proceedings of the Academy of Natural Sciences, Philadelphia*, **90**: 389-487.

PSG 128, *Phyllium celebicum* de Haan

Frank Hennemann, Gartenstrasse 14, 6702 Bad Dürkheim, Germany.

Key words
Phasmida, *Phyllium celebicum*, Breeding, Rearing.

Distribution

This species was first described by de Haan (1842: 111) from a female specimen from Tondano, Sulawesi (= Celebes). Gray (1843: 121) later described a male from the Philippines and illustrated the fore femur of the female. Westwood illustrated a male from the Philippines (Westwood 1859: pl. XL, fig. 6). Wood-Mason records it from Burma and illustrates the female and a female nymph (1875: 218, pl. XVI). Redtenbacher (1906: 175) additionally lists Vietnam, Seychelles, Laos, and Amboina. There are no subsequent records for the Seychelles so this was probably an error. Klante (1976: 63) gives a table which summarises the sizes of specimens from several of these localities. Other mentions in literature include Giglio-Tos (1914: 417), Rehn & Rehn (1933: 413, pl. 17, fig. 5) and Willemse (1945: 319, fig. 3).

The present culture, PSG 128, originates from Thailand.

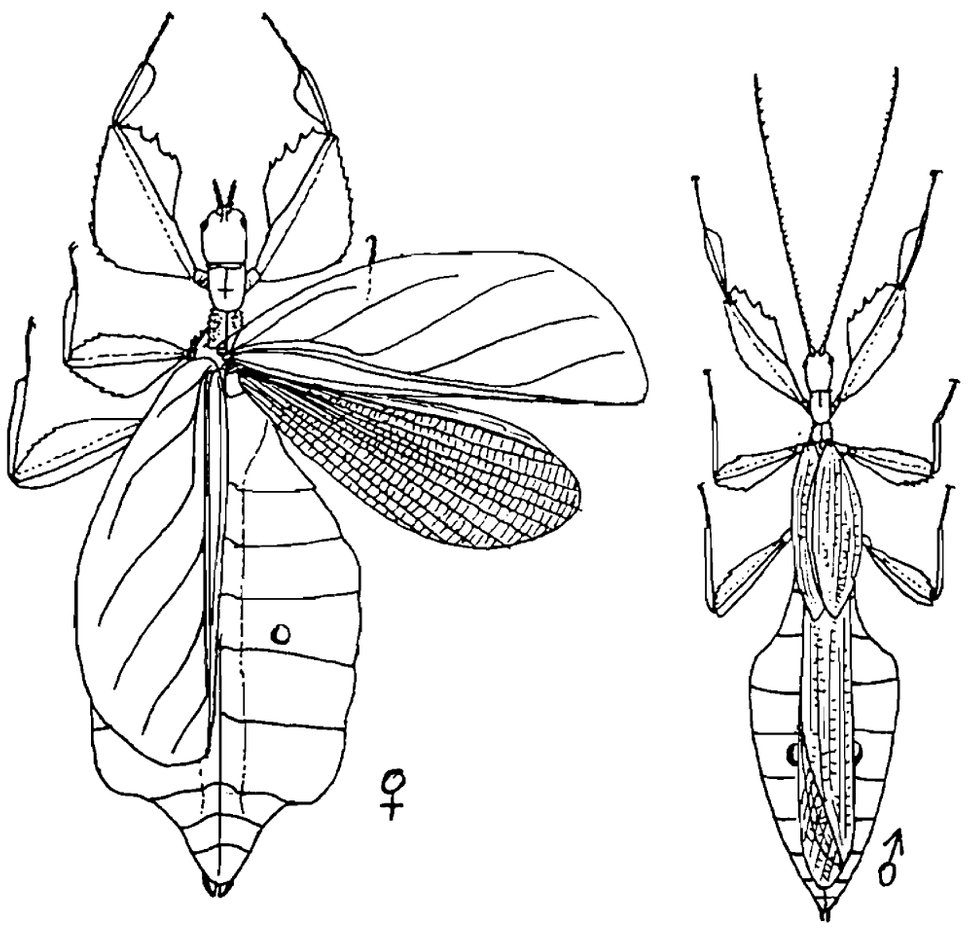


Figure 1. Adults of *Phyllium celebicum*.

Description of the adults

The adult female has a body length of 87-92mm (Klante, 1976 also records 87-92mm) and the widest part of the abdomen is 34-39mm. The body colour is similar to other *Phyllium* species,

light or grass green. This species is easily distinguished from others in the genus. Other *Phyllium* females have no hind wings but under the elytra of the female of *Phyllium celebicum* fully developed wings are concealed; these are about 45mm long. The female is unable to fly because the body is too heavy. Only the mid and hind tibiae have no lobes. As in other *Phyllium* species, the antennae of the female are very short.

Sizes (mm)	Female	Male	1st Instar
Body length	87-92	55-60	12-15
Maximum body width	34-39	17-21	-
Antennae	2.5-3.0	40	-
Fore leg	40	30	-
Mid leg	33	25	-
Hind leg	40	25	-

The adult male has a body length 55-60mm (Klante 1976 records 55-59). The greatest width of the abdomen is 17-21mm, on the third and fourth segments. His body colour is like that of the female, light or grass green. The body is wedge shaped and there are two transparent patches on the fourth abdominal segment. The wings are similar to those of other *Phyllium* species; they allow fluttering over short distances. As with the females, only the mid and hind tibiae are the only parts of the legs without lobes. In common with other species in the genus, the antennae of the male are much longer than the female's.

Eggs (fig 2)
The eggs are shaped like a small deformed "jerry can" and are 5mm long and 3.5mm wide. The colour is a dull brown. The edges look like they are moss covered and around the capitulum and micropylar plate the egg is covered with some small holes. The micropylar plate is oval with the ends pointed. The capitulum is big and cone shaped.

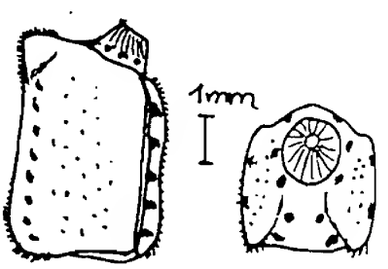


Figure 2. The egg of *Phyllium celebicum*.

Eggs should be incubated at 24-26°C and high humidity (70-80%). The best medium is peat.

Nymphs (fig 3)
The newly hatched nymphs are chestnut coloured and have white spots on the body and legs. The body length is 12-15mm on hatching. When they are older they become light green like the adults. In the third instar you can distinguish males and females; females are a bit bigger and have a wider abdomen than males. In the fourth instar you can distinguish the longer antennae of the males.

I keep my nymphs in a well ventilated cage at 22-24°C and spray them once or twice per day.

Defence
Nymphs try to escape by running away, adults do the same. What is not well known, is that *Phyllium* species possess defence glands like those of *Anisomorpha buprestoides* and *Oreophoetes*

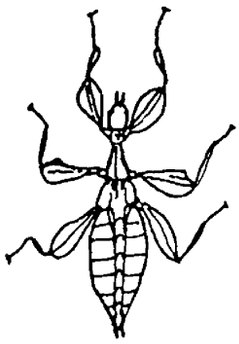


Figure 3. The nymph of *Phyllium celebicum*.

peruanas. They are situated on both sides of the pronotum and are used against predators like birds and monkeys.

Rearing

This species seems to be easier to rear than the other *Phyllium* species which have been in culture for some years in Europe (*P. bioculatum*, *P. giganteum*, *P. pulchrifolium*). Adults and nymphs should be kept warm (22-28°C) and humid (70-80%). The foodplant should be sprayed daily, this is important for the skin shedding. In these conditions nymphs take about six months to become adult.

Foodplants

Bramble, oak and pyracantha are eaten, nothing else has been tried.

References

Giglio-Tos, H. (1914) Results of the Arbor Expedition 1911/12. Part V. XXXI Orthoptera, III: Mantidae et Phasmidae. *Records of the Indian Museum*, **8**: 415-423.

Gray, G.R. (1843) Description of the species of the genus *Phyllium*. *Zoologist*, (1)1: 117-123.

Haan, W. de (1842) Bijddragen tot de Kennis Orthoptera. in Temminck, *Verhandelingen over de Natuurlijke Geschiedenis der Nederlandsche Overzeesche Bezittingen*. Volume 2.

Klante, H. (1976) Die "Wandelnden Blätter" Eine taxonomische Revision der Gattung *Phyllium* Ill. (Insecta Orthoptera, Phasmatoptera). *Zoologische Beiträge*, **22**: 49-76.

Redtenbacher, J. (1906) *Die Insektenfamilie der Phasmiden. Volume 1*. Leipzig.

Rehn, J.A.G. & Rehn, J.W.H. (1933) On certain species of the genus *Phyllium* (Orthoptera; Phasmidae). *Proceedings of the Academy of Natural Sciences of Philadelphia*, **85**: 411-427, pl. 16-17.

Westwood, J.O. (1859) *Catalogue of Orthopterous insects in the collection of the British Museum. Part I. Phasmidae*. London.

Wood-Mason, J. (1875) On new or little known species of Phasmidae, with a brief preliminary notice of the occurrence of a clasping apparatus in the males throughout the family. *Journal of the Asiatic Society of Bengal*. **44**: 215-220 pl. XVI & XVII.

Willemse, C. (1945) On *Phyllium* species, known from the Key Islands. (Orthoptera: Phasmidae, Phylliinae). *Tijdschrift voor Entomologie*, **88**: 316-322.

PSG 28, *Eurycnema herculeana* (Charpentier)

Frank Hennemann, Gartenstrasse 14, 6702 Bad Dürkheim, Germany.
Taxonomic notes by P.E. Bragg.

Key words
Phasmida, *Eurycnema herculeana*, *Eurycnema versifasciata*, Breeding, Rearing.

Taxonomy

When I started to list the synonymy of this species I found that there was confusion in the published synonyms.

Westwood (1859: 107) gave *E. herculeana* (Charpentier) as a junior synonym of *E. versirubra* (Serville), and also said these (and also *E. versifasciata*) were just a variation of *E. goliath* (Gray). Kirby (1904: 391) also considered *E. herculeana* to be a junior synonym of *E. versirubra*. Redtenbacher (1908: 468) listed *E. herculeana* as a species but also indicated *E. versifasciata* (Serville) as a probable synonym. Redtenbacher then gave *E. versirubra* as a junior synonym of *Eurycnema goliath* (Gray). Although I have not examined the type specimens, there has been so much confusion that it seems quite possible that Westwood was correct in thinking that all four of these species may be just variations of the same species.

One thing is clear however, *E. herculeana* is probably not the valid name for this species. If Kirby's synonym was correct, the name should be *E. versirubra:* if Redtenbacher's synonym is correct, the name should be *E. versifasciata*: if Westwood was correct, the name should be *E. goliath*. In any of these cases, *E. herculeana* would be incorrect as it is not the oldest name. However below I list only papers which mention the name *herculeana*.

Cyphocrania herculeana, Charpentier, 1841a: pl. 1.
Cyphocrania herculeana Charpentier, Charpentier, 1841b: 283.
Eurycnema herculeana (Charpentier), Brunn, 1898: 148.
Eurycnema herculanea (Charpentier), Hanitsch, 1902: 35-38. [misspelling]
Eurycnema herculeana (Charpentier), Redtenbacher, 1908: 468.
Eurycnema herculeana (Charpentier), Werner, 1934: 4.
Cyphocrania goliath (Gray, 1834: 45). [Synonymised by Westwood, 1859: 107.]
= *Cyphocrania hanitschi* Sharp, 1898: 89. [Synonymised by Brunn, 1898: 160.]
? *Eurycnema versifasciata* (Serville), Redtenbacher, 1908: 468.
Eurycnema versirubra (Serville), Kirby 1904: 391.

In view of this confusion, it is worth mentioning three papers which deal with breeding *E. versifasciata* from West Malaysia. These are by Geitel (1913), Kitchener (1960) and Nadchatram (1963); Kitchener referred to his as *E. goliath* but this was corrected by Nadchatram.

One final point on the classification, I do not know who identified the PSG culture or how certain they were. I have not attempted to identify the species myself.

Distribution

The PSG culture originates from West Malaysia. There is quite a detailed report of this species being reared in captivity in Singapore in 1897 (Hanitsch 1902). The species is sexual in the wild but all cultures appear to have been parthenogenetic. This species was originally described from Java and is also recorded from Timor, and Amboina by Redtenbacher (1908).

Adults

This is one of the larger phasmids to come out of West Malaysia. The adult females look like green versions of *Acrophylla wuelfingi* (Redtenbacher). The female (fig. 1) reaches a body length of 190-220mm. It has a grass-green basic colour with some dark green shading on the legs. On the head there are two blueish stripes. The feet, antennae and eyes are light reddish-brown. The elytra are green with some creamy white markings; the undersides are pink. The wings are transparent blueish green and are quite large, spanning 145-155mm, but are not used for flight because the body is much too heavy. They are just used to break the fall if the insect drops from the foodplant.

The mesonotum bears many large spines and some dark green or brown lines on the underside.

The abdomen swells to a thickness of about 15mm. The genital operculum (fig. 2) is very large and protrudes more than 15mm beyond the end of the abdomen, it is used as a sort of sling to throw the eggs. The cerci are very big and irregularly formed.

The legs are all serrated and, especially on the hind tibiae, there are many large spines which are used for defence in a similar way to *Heteropteryx dilatata* (Parkinson). At the end of the hind tibiae are two large, brown lobes (fig. 3.). Leg lengths are about: fore 95mm, mid 70mm, hind 100mm. The antennae are around 15mm long.

The male has a body length of about 130mm and is a greenish brown colour.

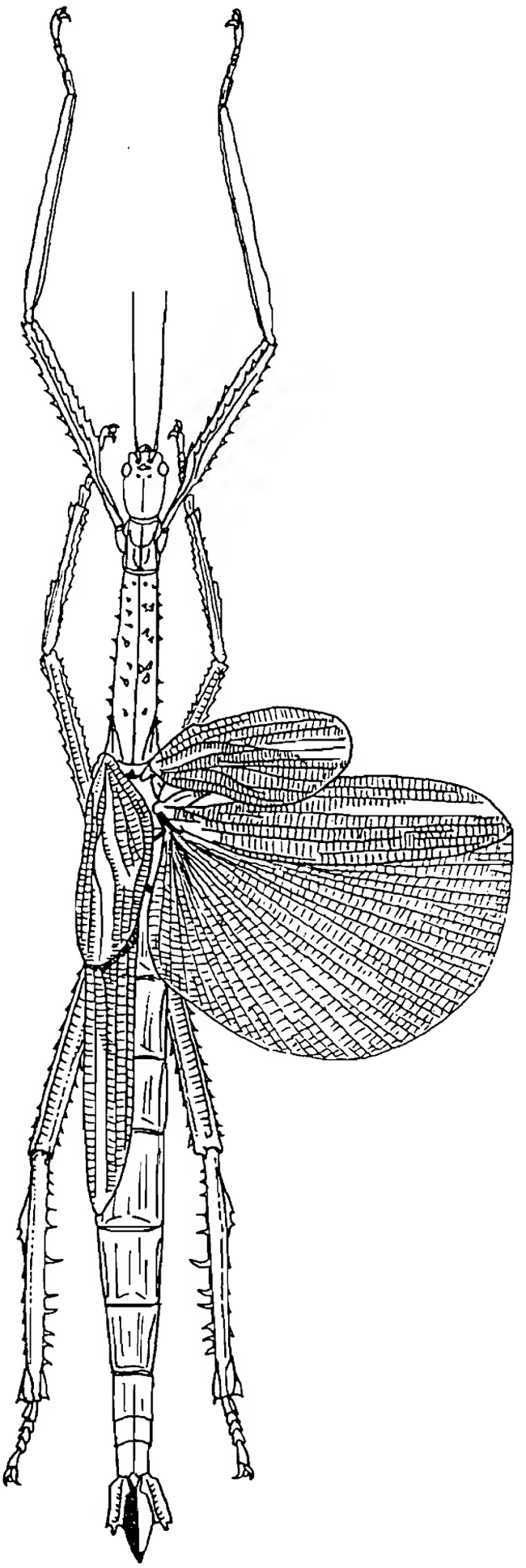


Figure 1. Female *Eurycnema herculeana*.

Eggs (fig. 4)
The eggs are about 6mm long, 4mm high and 3.5mm wide. The colour is mostly a reddish light-brown but sometimes can be black. The micropylar plate is very small and is the same colour as the egg. The operculum is a flat, round, reddish brown plate; it bears a very big, light brown, capitulum on its centre which disappears when the egg gets older.

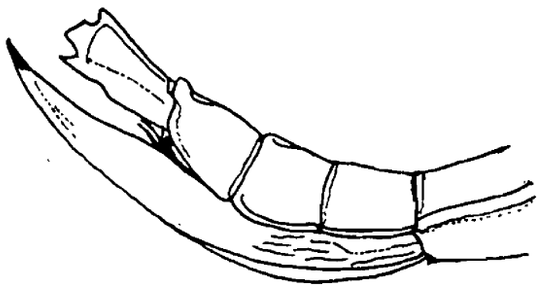


Figure 2. Genital operculum.

Eggs should be incubated at 25-30°C and a high humidity (80%) on a sand and peat mix. In these circumstances the nymphs hatch in about 6-15 months.

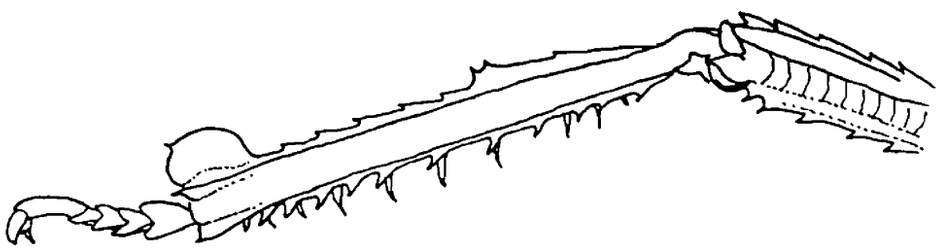


Figure 3. Hind tibia.

Nymphs (fig. 5)
The newly hatched nymph has a body length of about 28mm, a big round head and short antennae. The body colour is a shiny dark brown with some lighter markings on the head and legs. On each side of the body there is a greenish yellow stripe which ends at the eighth abdominal segment. At the end of the abdomen, as in the adults, there are two very large cerci.

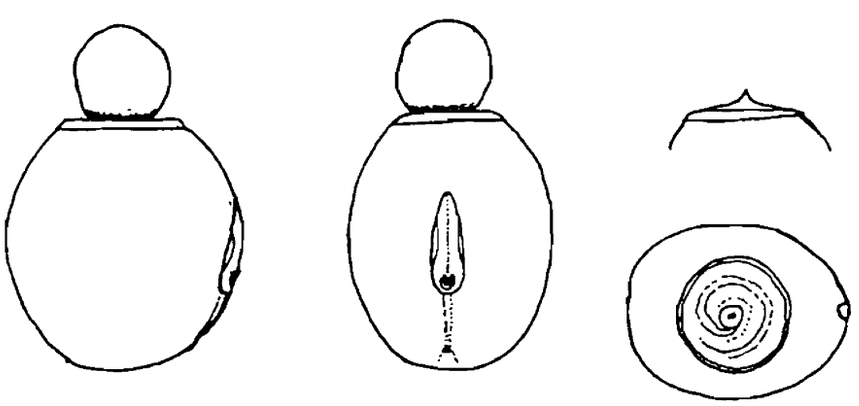


Figure 4. Egg of *Eurycnema herculeana*.

Defence
Nymphs try to escape by running or walking away. In addition, adults flash their wings or pinch with their hind legs.

Foodplants
The best foodplant seems to be Strawberry (*Fragaria* sp.), but I feed mine with Bramble (*Rubus* sp.) in winter and Oak (*Quercus* sp.) in summer. Nöel Mal reported that his also appreciate

Guava (*Psidium guayava*). A friend of mine told me that his also eat Raspberry (*Rubus idaeus*).

General comments

This is one of the more difficult species to rear successfully. Adults should be kept in a large well ventilated cage at about 25°C at night and 30°C in the daytime. Humidity should never be lower than 75%. Large nymphs should be kept in separate 50cm high cages, only one nymph per cage, to give them plenty of room to shed their skins.

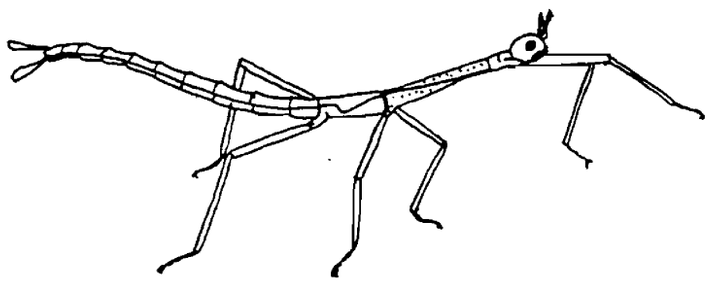


Figure 5. Nymph of *E. herculeana.*

References

Brunn, M. (1898) Parthenogenese bei Phasmiden, beobachtet durch einen überseeischen Kaufmann. *Mitteilungen Naturhistorischen Museum Hamburg*, **15**: 147-161.

Charpentier, T. de (1841a) *Orthoptera descripta & depicta*, Lipsiae.

Charpentier, T. de (1841b) Einige Bermerkungen die Orthopteren betreffend, besonders in bezug auf Burmeisters und Servilles Schriften. *Germar's Zeitschrift für entomol., 3: 283.*

Geitel H. (1913) Die Aufzucht von *Eurycnema versifasciata* (Phasmidae). *Entomologische Zeitschrift*, **24**(14): 73-76.

Gray, G.R. (1834) Descriptions of several species of Australian Phasmata. *Transactions of the Entomological Society of London*, **1**: 45-46.

Hanitsch, R. (1902) On the parthenogenetic breeding of *Eurycnema herculanea*, Charpentier. *Journal of the Royal Asiatic Society, Straits Branch*, **38**: 35-38.

Harman, A.J.E. (1988) The natural history of Chinese drugstores. *The Sabah Society Journal*, **8**(4): 435-436.

Kirby, F.W. (1904) *A synonymic catalogue of Orthoptera.* Volume 1. British Museum (Natural History), London.

Kitchener, H.J. (1960) The Giant Stick Insect - *Eurycnema goliath* Gray. *Malayan Nature Journal*, **14**: 147-151, pl. 6-8.

Nadchatram, M. (1963) The Winged Stick Insect, *Eurycnema versifasciata* Serville (Phasmida, Phasmatidae), with special reference to its life-history. *Malayan Nature Journal*, 17: 33-40.

Redtenbacher, J. (1908) *Die Insektenfamilie der Phasmiden*, Volume 3. Leipzig.

Sharp, D. (1898) Account of the Phasmidae, with notes on the eggs. in Willey, A.: *Zoological results of the tranverse of Venus expedition*, Volume 2. Cambridge University Press.

Werner, F. (1934) Mantides et phasmides recueilles dans les indes orientales. *Bulletin du Musée royal d'Histoire naturelle de Belgique*, **10**(22): 1-5.

Westwood, J.O. (1859) *Catalogue of Orthopterous insects in the collection of the British Museum. Part 1 Phasmidae.* London.

The Phasmid Database

P.E. Bragg, 8, Cornwall Ave, Beeston Rylands, Nottingham, NG9 1NL, UK.

Key words
Phasmida, Genera, Taxonomy, Identification, Classification, Computer, Database.

Introduction

The Phasmid Database consists of three computer files which have been developed over a period of three and a half years. It originally started as a small scale project to list all the names and authors of Bornean Phasmida but has been extended to include the name, date, publication, and recorded localities of all the described phasmids in the world.

The Phasmid Database is the most up-to-date source of information on all the described species of Phasmids. As a computerised system it offers far more flexibility than traditional formats. At the moment **The Phasmid Database** is by no means completed, but has reached the stage where I consider that it will be of use to other people and I have therefore decided to make it generally available.

The Phasmid Database is made up of three database files. The **species** file contains the original generic and specific names, authors, dates, publication titles and page references, and type localities for all described Phasmida. The **genera** file contains all valid genera, and includes the author, date, subfamily and tribe for each genus. The **subfams** file contains the families and subfamilies. The **genera** and **subfams** files can be linked together, at a later stage it will also be possible to link the **species** file with them. The taxonomy of the families, subfamilies and tribes is a slightly corrected form of that used by Bradley & Galil (1977).

Due to the original concept and some early difficulties in obtaining copies of important monographs, the data entered in the early stages was often very limited and resulted in some errors. Many, if not all, of these early errors have since been corrected. Whenever possible the original publications have been consulted; accumulation of papers and checking is an on-going process.

Distribution data is made up of the original locality and subsequent published records. All localities are recorded in one field of the database; the original localities are followed by a full stop and the subsequent localities which are separated by commas. The later records have been added by searching through over 1000 papers in my own collection. My collection of papers consists mainly of large works by any authors, papers by authors who produced numerous papers concerned with distribution of phasmids (Hebard, Günther, Rehn,) and papers which deal specifically with South East Asia. There is a bias towards papers published in English.

Uses

The **species** file should prove of use to Museums and individuals for a variety of purposes. Nothing comprehensive has been published since Brunner von Wattenwyl & Redtenbacher's work (1906-1908) which is now very much out of date; because of its comprehensive nature, it is likely to continue to be the starting point for identification for some time. The **species** file can provide information on the 2916 described species; of these 21% (624 species) have been described since the 1908 monograph. The **genera** file can suggest related genera which may require investigation. The most obvious uses of the database are to:

1. Check post-1908 species, or those which were missed out by Brunner & Redtenbacher and are

therefore not in their keys.
2. Find literature, descriptions, drawings etc. on recently described species.
3. Produce Geographical distribution lists.

However it can be used for more trivial pursuits such as counting the number of species described by particular authors, or the number of species described each decade (fig. 1.).

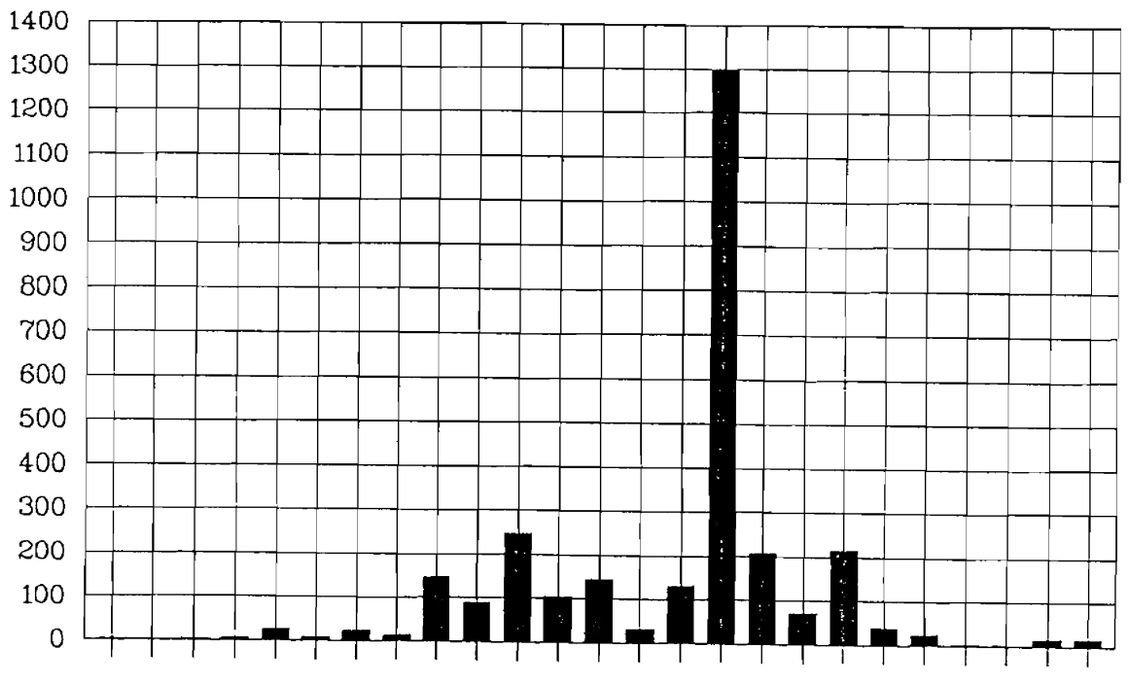


Figure 1. Number of species described each decade from 1850 to 1992.

Changes to genera given in Bradley & Galil

Bradley & Galil's (1977) paper contains numerous errors, including spelling errors in the generic names. These have been corrected as have some more major errors and omissions, however there are still some points which still require checking. Some of the more important corrections are listed below:

1. Some valid genera were omitted:
a) *Moritasgus* Günther 1935, in the subfamily Necrosciinae, this is not listed in either Zoological Record or Neave (1940, 1950, 1960).
b) *Extatosoma* Gray 1835, which I have placed in the tribe Tropidoderini.
2. A number of invalid genera were included by Bradley & Galil, these are not included in the database:
a) *Battacus* Werner 1918 and *Eurynecroscia* Dohrn 1910 are both junior synonyms of *Tagesoidea* Redtenbacher 1908 (the type species are both synonyms of *Tagessoidea nigrofasciata* Redtenbacher).
b) *Echinoclonia* Carl 1913 is a junior synonym of *Apora* Brunner 1908.

c) *Platyphasma* Uvarov 1940 is a junior objective synonym of *Planispectrum* Rehn & Rehn 1938.
d) *Chersaeus* Redtenbacher 1908 is a junior synonym of *Phaenopharos* Kirby 1904.
e) *Dixippus* Stål 1875 and *Phasgania* Kirby 1896 are both junior synonyms of *Carausius* Stål 1875.
f) *Lamarchinus* Uvarov 1940 replaces *Lamachus* Stål 1877 because Stäl's name was preoccupied by *Lamachus* Foerster 1868. Although Uvarov's spelling of *Lamarchus* was incorrect (1940: 175), it is clear that he was referring to *Lamachus* so the replacement name is valid.

3. Three subgenera of Redtenbacher's, *Epidares*, *Hemiplasta*, and *Rhamphosipyloidea* were listed as genera. One (*Hemiplasta*) was raised to generic status by Günther (1939: 88). Although treating the other two as genera may have been unintentional by Bradley & Galil, I am treating it as a deliberate policy. Redtenbacher only used subgenera in these three cases so he clearly considered the differences significant and raising these to generic status is not unreasonable.
4. The subfamily name Bacteriinae is used in preference to Cladomorphinae which was used by Bradley and Galil. The latter name, created by Brunner (1893: 90) was based on a previously published junior synonym (Westwood, 1859: 72) and is therefore invalid. For the same reason the tribal name Bacteriini is used in place of Cladomorphini.
5. The tribal name Neopromachini is used in preference to Menexenini. Use of Bradley and Galil's key (1977: 181), which is based on Günther's paper (1953), places the genus *Menexenus* in the tribe Lonchodini (as did Günther). Menexenini is therefore not a valid name for the tribe as it is based on a genus (*Menexenus*) which is not in that group. The name Neopromachini, proposed by Günther (1953: 560), is correct.
6. The genus *Parastheneboea* is listed twice by Bradley & Galil; once, correctly, as *Parastheneboea* Redtenbacher in the Necrosciinae and once, incorrectly, as *Parastheneboea* Carl in the Lonchodini. The entry under Lonchodini appears to be a error copied from Günther (1953: 560), who presumably intended to refer to *Pseudostheneboea* Carl.
7. The genus *Thaumatobactron* Günther 1929 is included by Bradley and Galil, as is *Poecilobactron* Günther, both listed in the Eurycanthinae. I can find no mention of *Poecilobactron* in any of Günther's papers except for "*Poecilobactron* Gthr. 1930" in a list of genera in the Eurycanthinae (1956: 556); this list does not include *Thaumatobactron*. I believe that this was an error by Günther, the type species of *Thaumatobactron* is *T. poecilosoma*, and Günther appears to have confused the names in his 1953 paper which was then copied by Bradley & Galil. Günther only published two papers in 1930 (Urich 1975) and I have checked both of these and find no reference to *Poecilobactron*, although one mentions *Thaumatobactron* (1930b: 732); the other paper concerns South American species (1930a). I have therefore omitted *Poecilobactron* from the database.
8. There are two cases of genera which may be valid although Bradley & Galil did not consider them as such. These involve type species which have been placed in different genera and synonymised differently by various authors, I have not yet resolved these cases and have therefore included the genera in the database. These are: *Bacillidium* Uvarov 1939 (a replacement name for *Bactridium* Saussure 1868) and *Dyme* Stål 1875.
9. There have been some changes published since Bradley & Galil's paper:

a) *Micrarchus* Carl 1913 is a junior synonym of *Pachymorpha* Westwood 1859.
b) The following new genera have been described: *Microcanachus* Donskoff 1988, *Parahyrtacus* Hausleithner 1990, *Pseudoclitarchus* Salmon 1991 and *Spinotectarchus* Salmon 1991.

The genera, with their subfamily, tribe, author and date of publication are listed below in alphabetical order.

GENUS	SUBFAMILY	TRIBE	AUTHOR	DATE
Abrosoma	Aschiphasmatinae	-	Redtenbacher	1906
Acacus	Necrosciinae	-	Brunner	1907
Acanthoclonia	Pygirhynchinae	-	Stål	1875
Acanthoderus	Pachymorphinae	Pachymorphini	Gray	1835
Acanthodyta	Eurycanthinae	-	Sharp	1898
Acanthograeffea	Platycraninae	-	Günther	1931
Acanthometriotes	Pseudophasmatinae	Xerosomatini	Hebard	1924
Acanthomima	Phasmatinae	Acanthomimini	Kirby	1904
Acanthoxyla	Phasmatinae	Acanthoxylini	Uvarov	1944
Achrioptera	Phasmatinae	Achriopterini	Coquerel	1861
Acrophylla	Phasmatinae	Phasmatini	Gray	1835
Agamemnon	Bacteriinae	Hesperophasmatini	Moxey	1971
Agathemera	Pseudophasmatinae	Anisomorphini	Stål	1875
Agrostia	Pseudophasmatinae	Stratocleini	Redtenbacher	1906
Anarchodes	Necrosciinae	-	Redtenbacher	1908
Anasceles	Necrosciinae	-	Redtenbacher	1908
Anchiale	Phasmatinae	Phasmatini	Stål	1875
Andropromachus	Necrosciinae	-	Carl	1913
Anisa	Pseudophasmatinae	Stratocleini	Redtenbacher	1906
Anisacantha	Heteropteryginae	Anisacanthini	Redtenbacher	1906
Anisomorpha	Pseudophasmatinae	Anisomorphini	Gray	1835
Anophelepis	Platycraninae	-	Westwood	1859
Antherice	Pseudophasmatinae	Stratocleini	Redtenbacher	1906
Antongilia	Bacillinae	Antongilini	Redtenbacher	1906
Aploploides	Bacteriinae	Hesperophasmatini	Rehn & Hebard	1938
Aplopus	Bacteriinae	Hesperophasmatini	Gray	1835
Apora	Necrosciinae	-	Brunner	1907
Aretaon	Heteropteryginae	Obrimini	Rehn & Rehn	1938
Argosarchus	Phasmatinae	Acanthoxylini	Brunner	1898
Arphax	Phasmatinae	Acanthoxylini	Stål	1875
Aruanoidea	Necrosciinae	-	Brunner	1893
Asceles	Necrosciinae	-	Redtenbacher	1908
Aschiphasma	Aschiphasmatinae	-	Westwood	1830
Aschiphasmodes	Necrosciinae	-	Karny	1923
Asprenas	Eurycanthinae	-	Stål	1875
Asystata	Necrosciinae	-	Redtenbacher	1908
Athertonia	Tropidoderinae	Tropidoderini	Sjöstedt	1918
Autolyca	Pseudophasmatinae	Anisomorphini	Stål	1875
Bacillidium	Bacteriinae	Cladoxerini ?	Uvarov	1939
Bacillus	Bacillinae	Bacillini	Audinet-Serville	1825
Bacteria	Bacteriinae	Bacteriini	Latreille	1825
Bactricia	Heteronemiinae	Libethrini	Kirby	1904
Bactrododema	Palophinae	-	Stål	1858
Baculum	Phasmatinae	Baculini	Saussure	1870
Bacunculus	Pseudophasmatinae	Bacunculini	Burmeister	1838
Bathycharax	Bacillinae	Xylicini	Kirby	1896
Bostra	Bacteriinae	Hesperophasmatini	Stål	1875
Brachyelena	Pseudophasmatinae	Stratocleini	Hebard	1933
Brachyrhamphus	Platycraninae	-	Carl	1915
Brachyrtacus	Lonchodinae	Neopromachini	Sharp	1898
Brasidas	Heteropteryginae	Obrimini	Rehn & Rehn	1938
Brizoides	Pseudophasmatinae	Stratocleini	Redtenbacher	1906
Burria	Pachymorphinae	Ramulini	Brunner	1900
Calvisia	Necrosciinae	-	Stål	1875
Calynda	Heteronemiinae	Heteronemiini	Stål	1875
Canachus	Eurycanthinae	-	Stål	1875
Candaules	Necrosciinae	-	Stål	1875
Canuleius	Pygirhynchinae	-	Stål	1875
Carausius	Lonchodinae	Lonchodini	Stål	1875
Centema	Necrosciinae	-	Redtenbacher	1908
Centrophasma	Necrosciinae	-	Redtenbacher	1908
Ceratiscus	Pachymorphinae	Ramulini	Caudell	1904
Cercophylla	Necrosciinae	-	Redtenbacher	1908
Ceroys	Pygirhynchinae	-	Audinet-Serville	1835
Chitoniscus	Phylliinae	-	Stål	1875
Chlorophasma	Pseudophasmatinae	Stratocleini	Redtenbacher	1906
Chondrostethus	Lonchodinae	Lonchodini	Kirby	1896
Cirsia	Bacillinae	Antongilini	Redtenbacher	1906
Citrina	Pseudophasmatinae	Stratocleini	Redtenbacher	1906
Cladoxerus	Bacteriinae	Cladoxerini	Latreille	1825
Clitarchus	Phasmatinae	Acanthoxylini	Stål	1875
Clonistria	Bacteriinae	Hesperophasmatini	Stål	1875

Clonopsis	Bacillinae	Bacillini	Pantel	1915
Cnipsus	Eurycanthinae	-	Redtenbacher	1908
Cooktownia	Xeroderinae	-	Sjöstedt	1918
Cotylosoma	Xeroderinae	-	Wood-Mason	1878
Craspedonia	Bacteriinae	Craspedoniini	Westwood	1843
Creaxylus	Pseudophasmatinae	Xerosomatini	Audinet-Serville	1839
Ctenomorpha	Phasmatinae	Phasmatini	Gray	1833
Ctenomorphodes	Phasmatinae	Phasmatini	Karny	1923
Cylindomena	Necrosciinae	-	Günther	1935
Dagys	Pachymorphinae	Hemipachymorphini	Günther	1935
Dajaca	Pseudophasmatinae	Prisopodini	Brunner	1893
Damasippoides	Pseudophasmatinae	Prisopodini	Brancsik	1893
Damasippus	Pseudophasmatinae	Prisopodini	Stål	1875
Dares	Heteropteryginae	Datamini	Stål	1875
Datames	Heteropteryginae	Datamini	Stål	1875
Decidia	Pseudophasmatinae	Anisomorphini	Stål	1875
Dematobactron	Palophinae	-	Karny	1923
Diacanthoidea	Necrosciinae	-	Redtenbacher	1908
Diangelus	Necrosciinae	-	Brunner	1907
Diapherodes	Bacteriinae	Hesperophasmatini	Gray	1835
Diapheromera	Heteronemiinae	Heteronemiini	Gray	1835
Diardia	Necrosciinae	-	Redtenbacher	1908
Didymuria	Tropidoderinae	Tropidoderini	Kirby	1904
Diesbachia	Necrosciinae	-	Redtenbacher	1908
Dilophocephalus	Necrosciinae	-	Tolido Piza	1938
Dinelytron	Pseudophasmatinae	Prisopodini	Gray	1835
Dinophasma	Aschiphasmatinae	-	Uvarov	1940
Dryococelus	Eurycanthinae	-	Gurney	1947
Dyme	Heteronemiinae	Libethrini	Stål	1875
Echetlus	Platyceraninae	-	Stål	1875
Echinothorax	Lonchodinae	Lonchodini	Günther	1931
Ectentoria	Phasmatinae	Baculini	Brunner	1907
Elicius	Platyceraninae	-	Günther	1935
Epibacillus	Bacillinae	Bacillini	Redtenbacher	1906
Epicharmus	Xeroderinae	-	Stål	1875
Epidares	Heteropteryginae	Datamini	Redtenbacher	1906
Erastus	Platyceraninae	-	Redtenbacher	1908
Erringtonia	Phasmatinae	Baculini	Brunner	1907
Eubias	Necrosciinae	-	Günther	1935
Eubulides	Heteropteryginae	Obrimini	Stål	1877
Euobrimus	Heteropteryginae	Obrimini	Rehn & Rehn	1938
Eupromachus	Lonchodinae	Neopromachini	Brunner	1907
Eurycantha	Eurycanthinae	-	Boisduval	1835
Eurycnema	Phasmatinae	Phasmatini	Audinet-Serville	1839
Extatosoma	Tropidoderinae	Tropidoderini	Gray	1833
Galactea	Necrosciinae	-	Redtenbacher	1908
Gargantuoidea	Necrosciinae	-	Redtenbacher	1908
Gharianus	Phasmatinae	Baculini	Werner	1908
Gigantophasma	Phasmatinae	Pharnaciini	Sharp	1898
Gongylopus	Pachymorphinae	Ramulini	Brunner	1907
Graeffea	Platyceraninae	-	Brunner	1868
Greenia	Lonchodinae	Lonchodini	Kirby	1896
Haaniella	Heteropteryginae	Heteropterygini	Kirby	1904
Harpuna	Pseudophasmatinae	Xerosomatini	Redtenbacher	1906
Hemipachymorpha	Pachymorphinae	Hemipachymorphini	Kirby	1904
Hemiplasta	Necrosciinae	-	Redtenbacher	1908
Hemisosibia	Necrosciinae	-	Redtenbacher	1908
Hermarchus	Phasmatinae	Pharnaciini	Stål	1875
Hesperophasma	Bacteriinae	Hesperophasmatini	Rehn	1901
Heterocopus	Heteropteryginae	Obrimini	Redtenbacher	1906
Heteronemia	Heteronemiinae	Heteronemiini	Gray	1835
Heterophasma	Tropidoderinae	Monandropterini	Redtenbacher	1908
Heteropteryx	Heteropteryginae	Heteropterygini	Gray	1835
Hirtuleius	Bacteriinae	Bacteriini	Stål	1875
Holca	Pseudophasmatinae	Stratocleini	Redtenbacher	1906
Holcoides	Pseudophasmatinae	Stratocleini	Hebard	1919
Hoploclonia	Heteropteryginae	Obrimini	Stål	1875
Hovaspectrum	Phasmatinae	Achriopterini	Rehn	1940
Hyrtacus	Lonchodinae	Neopromachini	Stål	1875
Ignacia	Pseudophasmatinae	Pseudophasmatini	Rehn	1904
Ilocano	Heteropteryginae	Obrimini	Rehn & Rehn	1938
Isagoras	Pseudophasmatinae	Xerosomatini	Stål	1875
Ischnophasma	Palophinae	-	Uvarov	1940
Kalokorinnis	Korinninae	-	Günther	1932

Kimberleyana	Tropidoderinae	Tropidoderini	Sjöstedt	1918
Korinnis	Korinninae	-	Günther	1932
Labidiophasma	Eurycanthinae	-	Carl	1915
Lamachodes	Necrosciinae	-	Redtenbacher	1908
Lamarchinus	Necrosciinae	-	Uvarov	1940
Lamponius	Bacteriinae	Hesperophasmatini	Stål	1875
Leiophasma	Pygirhynchinae	-	Uvarov	1940
Leosthenes	Xeroderinae	-	Stål	1875
Leprocaulinus	Necrosciinae	-	Uvarov	1940
Leprodes	Bacillinae	Antongilini	Redtenbacher	1906
Leptynia	Pachymorphinae	Ramulini	Pantel	1890
Leptyniella	Pachymorphinae	Ramulini	Bolivar	1926
Libethra	Heteronemiinae	Libethrini	Stål	1875
Libethroidea	Heteronemiinae	Libethrini	Hebard	1919
Litosermyle	Heteronemiinae	Heteronemiini	Hebard	1919
Lonchodes	Lonchodinae	Lonchodini	Gray	1835
Lopaphus	Necrosciinae	-	Westwood	1859
Loxopsis	Necrosciinae	-	Westwood	1859
Lysicles	Tropidoderinae	Tropidoderini	Stål	1877
Macellina	Pachymorphinae	Ramulini	Uvarov	1940
Macynia	Bacillinae	Bacillini	Stål	1875
Malandania	Tropidoderinae	Tropidoderini	Sjöstedt	1918
Malandella	Necrosciinae	-	Sjöstedt	1918
Manduria	Lonchodinae	Neopromachini	Stål	1877
Manomera	Heteronemiinae	Heteronemiini	Rehn & Hebard	1907
Marcenia	Lonchodinae	Lonchodini	Sjöstedt	1918
Marmessoidea	Necrosciinae	-	Brunner	1893
Mearnsiana	Heteropteryginae	Obrimini	Rehn & Rehn	1938
Medaura	Phasmatinae	Baculini	Stål	1875
Megacrania	Platycraninae	-	Kaup	1871
Megaphasma	Heteronemiinae	Heteronemiini	Caudell	1903
Meionecroscia	Necrosciinae	-	Redtenbacher	1908
Menexenus	Lonchodinae	Neopromachini	Stål	1875
Mesaner	Necrosciinae	-	Redtenbacher	1908
Metentoria	Phasmatinae	Baculini	Brunner	1907
Metriophasma	Pseudophasmatinae	Xerosomatini	Uvarov	1940
Micadina	Necrosciinae	-	Redtenbacher	1908
Microcanachus	Eurycanthinae	-	Donskoff	1988
Mimarchus	Pachymorphinae	Pachymorphini	Carl	1913
Miroceramia	Heteropteryginae	Heteropterygini	Günther	1934
Miroceroys	Pygirhynchinae	-	Toledo Piza	1936
Mirophasma	Pygirhynchinae	-	Redtenbacher	1906
Mithrenes	Lonchodinae	Lonchodini	Stål	1877
Mnesilochus	Lonchodinae	Lonchodini	Stål	1877
Monandroptera	Tropidoderinae	Mondandropterini	Audinet-Serville	1839
Moritasgus	Necrosciinae	-	Günther	1935
Mortites	Lonchodinae	Neopromachini	Günther	1935
Myronides	Lonchodinae	Lonchodini	Stål	1875
Nanophyllium	Phylliinae	-	Redtenbacher	1906
Nearchus	Phasmatinae	Pharnaciini	Redtenbacher	1908
Necroscia	Necrosciinae	-	Audinet-Serville	1839
Necrosciodes	Necrosciinae	-	Karny	1923
Neoclides	Necrosciinae	-	Uvarov	1940
Neopromachus	Lonchodinae	Neopromachini	Gigilo-Tos	1912
Nescicroa	Necrosciinae	-	Karny	1923
Nesiophasma	Phasmatinae	Baculini	Günther	1934
Nisyrus	Xeroderinae	-	Stål	1877
Obrimus	Heteropteryginae	Obrimini	Stål	1875
Ocnobius	Bacillinae	Xylicini	Redtenbacher	1906
Ocnophila	Heteronemiinae	Heteronemiini	Brunner	1907
Olcyphides	Pseudophasmatinae	Stratocleini	Griffini	1899
Olinia	Pseudophasmatinae	Xerosomatini	Redtenbacher	1906
Ommatopseudes	Platycraninae	-	Günther	1942
Onchestus	Phasmatinae	Phasmatini	Stål	1877
Oncotophasma	Heteronemiinae	Heteronemiini	Rehn	1904
Onogastris	Bacillinae	Antongilini	Redtenbacher	1906
Ophicrania	Platycraninae	-	Kaup	1871
Oreophasma	Pachymorphinae	Hemipachymorphini	Günther	1929
Oreophoetes	Heteronemiinae	Heteronemiini	Rehn	1904
Orestes	Heteropteryginae	Datamini	Redtenbacher	1906
Orthomeria	Aschiphasmatinae	-	Kirby	1904
Orthonecroscia	Necrosciinae	-	Kirby	1904
Orxines	Necrosciinae	-	Stål	1875
Otraleus	Necrosciinae	-	Günther	1935

Oxyartes	Necrosciinae	-	Stål	1875
Pachymorpha	Pachymorphinae	Pachymorphini	Gray	1835
Pachyphloea	Pygirhynchinae	-	Redtenbacher	1906
Pachyscia	Necrosciinae	-	Redtenbacher	1908
Palophus	Palophinae	-	Westwood	1859
Papuanoidea	Phasmatinae	Phasmatini	Werner	1930
Parabacillus	Pachymorphinae	Ramulini	Caudell	1903
Parabactridium	Bacteriinae	Cladoxerini	Redtenbacher	1908
Parabrosoma	Aschiphasmatinae	-	Giglio-Tos	1910
Paracanachus	Eurycanthinae	-	Carl	1915
Paracentema	Necrosciinae	-	Redtenbacher	1908
Paraclitumnus	Phasmatinae	Baculini	Brunner	1893
Paracyphocrania	Phasmatinae	Phasmatini	Redtenbacher	1908
Paradiacantha	Necrosciinae	-	Redtenbacher	1908
Parahyrtacus	Lonchodinae	Neopromachini	Hausleithner	1990
Paraleptynia	Pachymorphinae	Ramulini	Caudell	1904
Paraloxopsis	Necrosciinae	-	Günther	1934
Paramenexenus	Necrosciinae	-	Redtenbacher	1908
Paramyronides	Necrosciinae	-	Redtenbacher	1908
Paranecroscia	Necrosciinae	-	Redtenbacher	1908
Paranisomorpha	Pseudophasmatinae	Anisomorphini	Redtenbacher	1906
Parapachymorpha	Pachymorphinae	Ramulini	Brunner	1893
Paraphasma	Pseudophasmatinae	Stratocleini	Redtenbacher	1906
Paraprisopus	Pseudophasmatinae	Prisopodini	Redtenbacher	1906
Parasipyloidea	Necrosciinae	-	Redtenbacher	1908
Parasosibia	Necrosciinae	-	Redtenbacher	1908
Parastheneboea	Necrosciinae	-	Redtenbacher	1908
Parastratocles	Pseudophasmatinae	Stratocleini	Redtenbacher	1906
Parectatosoma	Heteropteryginae	Anisacanthini	Wood-Mason	1879
Paronchestus	Phasmatinae	Phasmatini	Redtenbacher	1908
Parorobia	Pygirhynchinae	-	Chopard	1952
Paraxyartes	Necrosciinae	-	Carl	1913
Peloriana	Phasmatinae	Phasmatini	Uvarov	1940
Pericentropsis	Lonchodinae	Lonchodini	Günther	1936
Periphetes	Lonchodinae	Lonchodini	Stål	1877
Periphloea	Pseudophasmatinae	Prisopodini	Redtenbacher	1906
Perliodes	Pseudophasmatinae	Xerosomatini	Redtenbacher	1906
Phaenopharos	Necrosciinae	-	Kirby	1904
Phaeophasma	Pseudophasmatinae	Prisopodini	Redtenbacher	1906
Phalces	Bacillinae	Antongilini	Stål	1875
Phantasca	Heteronemiinae	Libethrini	Redtenbacher	1906
Pharnacia	Phasmatinae	Pharnaciini	Stål	1877
Phasma	Phasmatinae	Phasmatini	Lichtenstein	1802
Phasmataenionema	Phasmatinae	Pharnaciini	Navas	1907
Phenacocephalus	Necrosciinae	-	Werner	1930
Phenacephorus	Lonchodinae	Lonchodini	Brunner	1907
Phibalosoma	Bacteriinae	Bacteriini	Gray	1835
Phobaeticus	Phasmatinae	Baculini	Brunner	1907
Phraortes	Lonchodinae	Lonchodini	Stål	1875
Phryganistria	Phasmatinae	Baculini	Stål	1875
Phthoa	Pachymorphinae	Ramulini	Karsch	1898
Phyllium	Phylliinae	-	Illiger	1798
Planispectrum	Heteropteryginae	Datamini	Rehn & Rehn	1938
Planudes	Pseudophasmatinae	Xerosomatini	Stål	1875
Platycrana	Platycraninae	-	Gray	1835
Platysosibia	Necrosciinae	-	Redtenbacher	1908
Podacanthus	Tropidoderinae	Tropidoderini	Gray	1833
Pomposa	Necrosciinae	-	Redtenbacher	1908
Presbistus	Aschiphasmatinae	-	Kirby	1896
Prexaspes	Pseudophasmatinae	Xerosomatini	Stål	1875
Prisomera	Lonchodinae	Lonchodini	Gray	1835
Prisopus	Pseudophasmatinae	Prisopodini	Latreille	1825
Prosceles	Necrosciinae	-	Uvarov	1940
Prosentoria	Phasmatinae	Baculini	Brunner	1907
Pseudobacteria	Heteronemiinae	Libethrini	Saussure	1872
Pseudoclitarchus	Phasmatinae	Acanthoxylini	Salmon	1991
Pseudodatames	Bacillinae	Antongilini	Redtenbacher	1906
Pseudodiacantha	Necrosciinae	-	Redtenbacher	1908
Pseudolcyphides	Pseudophasmatinae	Anisomorphini	Karny	1923
Pseudoleosthenes	Pseudophasmatinae	Prisopodini	Redtenbacher	1906
Pseudophasma	Pseudophasmatinae	Pseudophasmatini	Kirby	1896
Pseudopromachus	Pachymorphinae	Hemipachymorphini	Günther	1929
Pseudosermyle	Heteronemiinae	Heteronemiini	Caudell	1903
Pseudostheneboea	Lonchodinae	Lonchodini	Carl	1913

Pterinoxylus	Bacteriinae	Hesperophasmatini	Audinet-Serville	1839
Pterobrimus	Heteropteryginae	Obrimini	Redtenbacher	1906
Pterolibethra	Heteronemiinae	Libethrini	Günther	1940
Pygirhynchus	Pygirhynchinae	-	Audinet-Serville	1839
Pylaemenes	Heteropteryginae	Datamini	Stål	1875
Ramulus	Pachymorphinae	Ramulini	Saussure	1870
Rhamphophasma	Phasmatinae	Baculini	Brunner	1893
Rhamphosipyloidea	Necrosciinae	-	Redtenbacher	1908
Rhaphiderus	Tropidoderinae	Monandropterini	Audinet-Serville	1839
Scionecra	Necrosciinae	-	Karny	1923
Sermyle	Heteronemiinae	Heteronemiini	Stål	1875
Setosa	Pygirhynchinae	-	Redtenbacher	1906
Sinophasma	Necrosciinae	-	Günther	1940
Sipyloidea	Necrosciinae	-	Brunner	1893
Sosibia	Necrosciinae	-	Stål	1875
Spinotectarchus	Pachymorphinae	Hemipachymorphini	Salmon	1991
Staelonchodes	Lonchodinae	Lonchodini	Kirby	1904
Steleoxiphus	Pachymorphinae	Ramulini	Rehn	1906
Stenobrimus	Heteropteryginae	Obrimini	Redtenbacher	1906
Stephanacris	Phasmatinae	Stephanacridini	Redtenbacher	1908
Stratocles	Pseudophasmatinae	Stratocleini	Stål	1875
Syringodes	Necrosciinae	-	Redtenbacher	1908
Tagesoidea	Necrosciinae	-	Redtenbacher	1908
Taraxippus	Bacteriinae	Hesperophasmatini	Moxey	1971
Tectarchus	Pachymorphinae	Hemipachymorphini	Salmon	1954
Tenerella	Pseudophasmatinae	Stratocleini	Redtenbacher	1906
Tersomia	Bacteriinae	Hesperophasmatini	Kirby	1904
Thaumatobactron	Eurycanthinae	-	Günther	1929
Theramenes	Heteropteryginae	Obrimini	Stål	1875
Thrasyllus	Necrosciinae	-	Stål	1877
Timema	Timeminae	-	Scudder	1895
Tirachoidea	Phasmatinae	Pharnaciini	Brunner	1893
Tisamenus	Heteropteryginae	Obrimini	Stål	1875
Trachythorax	Necrosciinae	-	Redtenbacher	1908
Trapezaspis	Eurycanthinae	-	Redtenbacher	1908
Trigonophasma	Necrosciinae	-	Kirby	1904
Tropidoderus	Tropidoderinae	Tropidoderini	Gray	1835
Trychopeplus	Heteronemiinae	Heteronemiini	Shelford	1908
Vasilissa	Tropidoderinae	Tropidoderini	Kirby	1896
Vetilia	Phasmatinae	Phasmatini	Stål	1875
Wattenwylia	Pachymorphinae	Ramulini	Tolido Piza	1938
Woodlarkia	Heteropteryginae	Datamini	Günther	1931
Woodmansonia	Phasmatinae	Baculini	Brunner	1907
Xenomaches	Platycraninae	-	Kirby	1896
Xenophasmina	Xeroderinae	-	Uvarov	1940
Xera	Pseudophasmatinae	Xerosomatini	Redtenbacher	1906
Xerantherix	Pseudophasmatinae	Prisopodini	Brancsik	1893
Xeroderus	Xeroderinae	-	Gray	1835
Xeropsis	Pseudophasmatinae	Xerosomatini	Redtenbacher	1906
Xerosoma	Pseudophasmatinae	Xerosomatini	Audinet-Serville	1831
Xiphophasma	Pachymorphinae	Ramulini	Rehn	1913
Xylica	Bacillinae	Xylicini	Karsch	1898
Zehntneria	Pachymorphinae	Ramulini	Brunner	1907

System requirements

Written on a IBM compatible PC, **The Phasmid Database** will run on any database system which is compatible with **dBase3**. The database occupies 1.7MB of disk space at present. The version currently being released is slightly less than 0.7MB so it is possible to use a system without a hard disk; however the slow access time of most floppy disk drives means that in reality a hard disk is almost essential. Future developments are expected to increase this to somewhere in the region of 4.0MB.

Obtaining copies

Copies of **The Phasmid Database** can be obtained free of charge from my home address; you should send either three 5.25" (360 K) disks or one 3.5" (1.4MB) or one 3.5 (720 K) formatted disk and the cost of the return postage. Printed copies of the **species** information are available at a cost of £20.00 per copy.

Future releases

In its finished form, it is intended that **The Phasmid Database** will be a complete synonymic catalogue of the Phasmida, something which has not been published for almost 100 years. It will contain original and currently valid names of all described species of Phasmida.

The second stage, which is currently 50% completed, will give the current valid name for all species. This will the enable the **species** file to be linked with the **genera** and **subfams** files. The second stage is expected to be ready for release by the end of 1993.

The third stage involves the addition of all known synonyms, and published references to the species. These will be stored in a memo file associated with each species. This stage is currently in progress but is not expected to be completed until the end of 1994 at the earliest.

Acknowledgements

The problems with the tribal names in Bradley & Galil's paper were originally drawn to my attention by Judith Marshall.

References

Bradley, J.C. & Galil, B.S. (1977) The taxonomic arrangement of the Phasmatodea with keys to the subfamilies and tribes. *Proceedings of the Entomological Society of Washington*, **79**: 176-208.

Brunner de Wattenwyl, K. (1893) Révision du système des Orthoptères et description des espèces rapportées par M. Leonardo Fea de Birmanie. *Annali del Museo Civico di Storia Naturale di Genova*, **(2)13**: 1-230.

Brunner von Wattenwyl, K. (1907) *Die Insektenfamilie der Phasmiden*. Volume **2**. Leipzig.

Günther, K. (1930a) Neue und wenig bekannte Phasmoiden von Südamerika. *Mitteilungen aus dem Zoologischen Museum in Berlin*, **15**: 559-570.

Günther, K. (1930b) Weitere Beiträge zur Kenntnis der Phasmoidenfauna Neuguineas. *Mitteilungen aus dem Zoologischen Museum in Berlin*, **15**: 729-747.

Günther, K. (1939) Orthoptera Celebica Sarasiniana. II Phasmoidae. *Verhandlungen der Naturforschenden Gesellschaft in Basel*, **49**: 54-92.

Günther, K. (1953) Über dei taxonomische Gliederung und die geographische Verbreitung der Insektenordnung der Phasmatodea. *Beiträge zur Entomologie*, **(3)5**: 541-563.

Kirby, W.F. (1904) A synonymic Catalogue of Orthoptera. Volume **1**. British Museum (Natural History), London.

Neave, S.A. (1940) *Nomenclator zoologicus. A list of the names of genera and subgenera in zoology from the 10th edition of Linnaeus, 1758, to the end of 1935*. Volumes 1-4. Zoological Society of London, London.

Neave, S.A. (1950) as above, Volume **5**, Names listed for 1936-45.

Neave, S.A. (1960) as above, Volume **6**, Names listed for 1946-55.

Redtenbacher, J. (1906) *Die Insektenfamilie der Phasmiden*. Volume **1**. Leipzig.

Redtenbacher, J. (1908) *Die Insektenfamilie der Phasmiden*. Volume **3**. Leipzig.

Urich, K. (1975) Klaus Günther. *Zoologische Beiträge*, **21**: 347-361.

Uvarov, B.P. (1940) Twenty eight new generic names in Orthoptera. *Annals and Magazine of Natural History*, **(11)5**: 173-176.

Westwood, J.O. (1859) *Catalogue of the Orthopterous insects in the collection of the British Museum, Part I Phasmidae*. London.

Reviews and Abstracts.

Book Review.

by **Phil Bragg**.

Keeping and breeding butterflies and other exotica. by J.L. Stone.
Blandford. (1992) ISBN 0-7137-2293-2.

This book includes an eight page chapter on stick insects and a four page chapter on leaf insects. I have not looked into the content of the rest of the book. Three species of stick insect are mentioned along with one species of leaf insect. These chapters contain numerous mistakes for which there is little excuse. There is in fact very little advice on rearing, most of the chapter is devoted to describing the appearance and behaviour of the insects.

The distribution of *Extatosoma tiaratum* is incorrect, it has not been recorded from New Guinea. This error calls into question both the notes on foodplants in the wild, and the description of this species being used as food in longhouses in New Guinea; I believe true longhouses only occur in Borneo. It seems likely that these refer to another species of *Extatosoma*, or perhaps more likely, to a species of *Eurycantha*.

Incorrect generic names are used for three species, *Clitumnus extradentatus* (should be *Baculum extradentatum*), *Necroscia sipylus* (should be *Sipyloidea sipylus*) while the third example, *Carausius morosus*, is also listed as *Dixippus morosus*; it appears the author believes that these are two different species. The book states that *Eurycantha calcarata* can be cultured in the same manner as *Extatosoma tiaratum*, there is no mention of the need for an egg laying medium.

The chapter on leaf insects refers to *Phyllium crucifolium* which should, I assume, be *Phyllium bioculatum*. The opening sentence wrongly states that it belongs to the "subfamily Pseudophasmatinae", it is of course in a completely different family: the Phylliidae.

Book review: The review of *Rearing and studying stick and leaf-insects* by P.D. Brock, originally intended for this issue of *Phasmid Studies*, was published in the *Phasmid Study Group Newsletter*, **52**: 3-4. A different review of this book was published in October 1992 in the *Bulletin of the Amateur Entomologists' Society*, **51**: 226-228.

Phasmid Abstracts

The following abstracts briefly summarise articles which have recently appeared in other publications. Some of these may be available from local libraries. Others will be available in university or college libraries, many of these libraries allow non-members to use their facilities for reference purposes free of charge.

The editor of *Phasmid Studies* would welcome recent abstracts from authors so that they may be included forthcoming issues. In the case of publications specialising in phasmids, *Phasma* and *Le Monde des Phasmes*, only the longer papers are summarised.

Baarda, G. (1992) Voer!! *Phasma*, **2**(6): 10-11.

The third article in the series under this title, continuing the theme of foodplants for phasmids in captivity. Requests information from readers to continue the series. Poses some questions and briefly discusses some of the problems associated with trying new foodplants.

Baarda, G. (1992) Voer!! *Phasma*, **2**(7): 13-14.

The fourth article in the series discusses foodplants for use in winter. Several plants are recommended for trials: *Cotoneaster* spp., *Hypericum* spp., *Pyracantha* spp. and *Viburnum* spp.

Bragg, P.E. (1992) *nolimetangere* un phasme que l'on peu toucher! *Le Monde des Phasmes*, **18**: 4-5.

The spines on members of the Heteropteryginae should offer protection against predation. In experiments with captive *Epidares nolimetangere* it was found that they do not prevent them from being eaten by *Chalcides ocellatus*, a lizard from the Mediterranean.

Bragg, P.E. (1992) Les coccinelles mangent des phasmes. *Le Monde des Phasmes*, **18**: 6.

Reports on an experiment into the feasibility of using ladybirds to control aphids in phasmid cages. Concludes that they are unsuitable, *Coccinella 7-punctata* will eat phasmid nymphs.

Bragg, P.E. (1992) Des idées lumineuses pour la nuit. *Le Monde des Phasmes*, **18**: 9-10.

Discusses the advantages of headtorches for collecting phasmids in the wild. Summarises the types readily available in the U.K.

Bragg, P.E. (1992) The phasmid *Carausius abbreviatus* (Brunner) from Borneo, including a description of the female. *Entomologists' Monthly Magazine*, **128**: 129-235.

The female and egg of *Carausius abbreviatus* are described. The male, female and egg are illustrated. The distribution is discussed and details of the rearing conditions are given. The taxonomy of the genus is briefly discussed, with an explanation of the synonymy of *Carausius* (= *Dixippus* = *Phasgania*).

Chen, S.C. (1992) A new species of the genus *Macellina* (Phasmida: Heteronemiidae, Pachymorphinae). *Acta Entomologica Sinica*, **35**(1): 72-74.

A new species, *Macellina baishuijiangia*, is described from Baishuijiang Reserve Area of Gansu. The holotype, a male, is deposited in Beijing Forestry University. This species is allied to *M. souchongia* (Westwood), the paper lists differences and *M. baishuijiangia* is illustrated.

Camousseight, A. & Bustamante, I. (1991) Descriptión de los Huevos de los Fásmidos (Phasmatodea: Pseudophasmatidae) de Chile. *Revista Chilena de Entomologica*, **19**: 39-43.

Description of the eggs of the phasmids of Chile, based on *Agatherema crassa*, *A. elegans*, *A. millipunctata*, *Xeropsis crassicornis*, *Bacunculus phyllopus*, *B. granulicollis*, *B. cornutus*, *B. blanchardi*, and *Paraprisopus* sp. The descriptions are given for the genera, not the species. Drawings of the micropylar plates are given but not drawings of whole eggs. There are 15 scanning electron micrographs although these do not show the same views for each genus.

D'Hulster, K. (1992) Eiafzetting (Ovipositie). *Phasma*, **2**(6): 5-6.

A short review of some of the egg laying methods used by phasmids.

D'Hulster, K. (1992) Verdedigings - mechanismen. *Phasma*, **2**(6): 7-9.

A review of some of the methods of defence used by phasmids.

Delfosse, E. (1992) Elevage des phyllies. *Le Monde des Phasmes*, **19**: 3-4.

A description of the author's method of maintaining temperature and humidity in a vivarium, yet preventing the insects from drowning in condensation. The vivarium is lined with fine netting and has a false base with netting over 2cm of water which provides the humidity.

Deschandol, A. (1992) Expédier des phasmes morts par la poste. *Le Monde des Phasmes*, **19**: 11-12.

Discusses and illustrates methods of packing dead phasmids for posting phasmids or transporting them in the field.

Floyd, D. (1992) Un très grande *Acanthoxyla prasina intermedia*. *Le Monde des Phasmes*, **19**: 10.

Reports on an exceptionally large captive reared specimen of *Acanthoxyla prasina intermedia*. Measurements are given for the various parts of the body of this 17.3cm long specimen.

Gorkom, E. van (1992) Wetenswaardigheden over de Javaanse reuzen wandelende tak *Eurycnema herculeana* (PSG 28). *Phasma*, **2**(7): 7-8.

Reports this species as a common pet in east Java. Gives advice on the best conditions for rearing this species (see Henneman, F. *PSG 28, Eurycnema herculeana* in this issue of *Phasmid Studies*).

Gorkom, E. van, Gorkom, O. van & Gorkom, J. van (1992) Takken uit de tropen. *Phasma*, **2**(7): 9-10.

Report of a collecting trip to Loksado, Kalimantan. Six species were collected. One is described and illustrated. [The illustrated species appears to be *Orthomeria* sp. - P.E. Bragg]

Gorkom, J.W. van (1992) Een nadere kennismaking met *Heteropteryx dilatata*. *Phasma*, **2**(6): 1-4.

Describes the life cycle and general biology of *Heteropteryx dilatata* (Parkinson) and narrates collecting this species in Bukit Lalong Forest Reserve, Malaysia.

Grösser, D. (1992) Zwei neue Arten der Gattung *Phyllium* aus Neugenia (Phasmatodea: Phyliidae). *Entomologische Zeitschrift*, **102**(9): 162-167.

Two new species of the genus *Phyllium*, *P. brevipennis* and *P. chitoniscoides*, from New Guinea are described and figured. A systematic list for the species of the genera *Phyllium*, *Chitoniscus*, and *Nanophyllium* is provided.

Haccart, L. (1992) Observation de la mue chez *Carausius morosus*. *Le Monde des Phasmes*, **18**: 14-15.

A brief illustrated account of *Carausius morosus* shedding its skin.

Langlois, F. & Lelong, P. (1992) Compte-rendu d'une chasse en Espagne. *Le Monde des Phasmes*, **19**: 5-7.

An account of phasmid collecting at Alcocéber in Spain. Reports three species, *Bacillus rossius*, *Clonopsis gallica*, and *Leptynia hispanica*. Males of *B. rossius* were found to be much more active than the females. *C. gallica* were found in very large numbers, sometimes 100-200 in one bramble patch. These *C. gallica* seem identical to those from France. *L. hispanica* was found to be common, although they are difficult to spot. Blowing air or smoke seems to help to locate this species. Both sexes were present and mating was found to last for a maximum of three or four hours.

Lelong, P. (1992) Attention espècies perdues. *Le Monde des Phasmes*, **18**: 7-8.

Discusses the PSG census of species in culture.

Lelong, P. (1992) Lampes frontales (suite). *Le Monde des Phasmes*, **18**: 10-11.

Continues the discussion (see above) on the relative merits of various headtorches for phasmid collecting. Includes technical information on the prices and battery duration of the various options.

Lelong, P. (1992) Cartographie des trois espèces Français. *Le Monde des Phasmes*, **18**: 16-17.

Gives French distribution maps for *Clonopsis gallica*, *Bacillus rossius*, and *Leptynia hispanica*.

Lelong, P. (1992) Une expérience étonnante. *Le Monde des Phasmes*, **19**: 9.

A problem with rearing *Bacillus atticus atticus* is that of the foodplant, Lentisc (*Pistacia lentiscus*), being difficult to obtain. The author tried *Coriaria myrtifolia* as a substitute and found that it was eaten one night by a nymph of this species. However the thorax of the insect became distended and the insect immobile. The author perforated the mesothorax and metathorax with a hypodermic needle, releasing a black fluid and a large volume of gas. After a few days the phasmid had fully recovered and was subsequently reared to adult. This plant is eaten without adverse effects by both *Bacillus rossius* and *Clonopsis gallica*. The author does not report any further experiments with *B. a. atticus* on this foodplant.

Malavasi, D. (1992) Stick insects (Phasmatodea, Bacillidae) from Italy. *Bulletin of the Amateur Entomologists' Society*, **51**: 207-212.

Lists the species and subspecies of phasmids found in Italy. Gives a distribution map for the different species and drawings to distinguish the abdomens of the females. The author reports that habitat destruction may be causing a decline in numbers.

Nijsen, F. (1992) Wandelende takken als hobby. *Phasma*, **2**(7): 21-24.

A narration of how the author's interest in phasmids developed and a general discussion of keeping phasmids as a hobby.

Potvin, W. (1992) Eieren zonder deksel van *Haaniella mulleri*. *Phasma*, **2**(7): 24.

Reports on, and illustrates, an egg of *Haaniella muelleri* which lacks an operculum.

Roget, J. (1992) Un très joli phasme: *Parectatosoma hystrix*. *Le Monde des Phasmes*, **19**: 13-15.

A report on how to rear this Madagascan species. The male and female are illustrated.

Sellick, J. (1992) Het ei van de wandelende tak. *Phasma*, **2**(7): 1-6.
A translation of *The phasmid egg* which appeared in *Phasmid Studies*, **1**(1): 8-9.

Spreter, V. (1992) Pour que densent les phyllies. *Le Monde des Phasmes*, **19**: 16-21.
Observes that about half of the issues of *Le Monde des Phasmes* contain articles on *Phyllium* spp. The author then narrates his early experiences with leaf insects. Humidity and temperature are considered very important and the author gives details of these considerations. Hatching the eggs and rearing the nymphs are then discussed.

Veltmann, K. (1992) Takken kijken. *Phasma*, **2**(6): 13-14.
Discusses three zoos which have phasmids on display; Artis, Amsterdam; Hortus Haren; Nooroder Dierenpark Emmen.